The

PUBLIC LIBRARY
JAN 28 1952
DETROIT

Nalco #71

PAPER MILL ANTIFOAM

- ☆ **CONTROLS** foam and bubble formation over wide pH range—4.0 to 9.5!
- ☆ **ELIMINATES** bubble formation on wires.
- ☆ **EASY** to mix and feed.
- ☆ **NO EFFECT** on other materials in the furnish.
- ☆ **ECONOMICAL**—Average cost less than 15¢ PER TON of paper produced.

NALCO 71 not only positively eliminates foam and bubble formation in paper machine systems without affecting the furnish, but it also *stays in the water.* This means that remarkably small dosages of 71 efficiently prevent foam overflows, wadding, uneven caliper and other foam difficulties. Churning of Jordans, action of stock pumps and the flow of stock—the very things that cause foaming in untreated systems—all promote better action of Nalco 71!

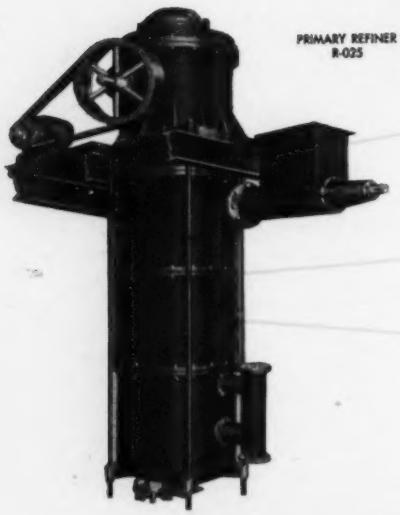
Complete information on Nalco 71—and on other Nalco Chemicals for paper manufacturing use will be furnished upon request. Write today for prompt action on a permanent solution for your foaming problems.

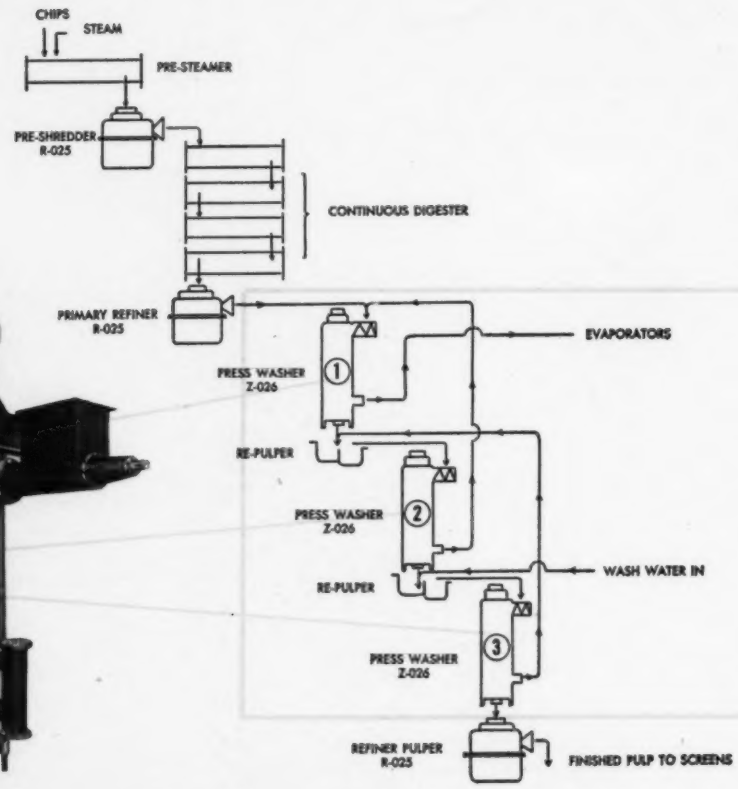
NATIONAL ALUMINATE CORPORATION
6232 West 66th Place
Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario, Canada

THE Nalco SYSTEM
Serving the Paper Industry through Practical Applied Science

DIGESTION
REFINING
WASHING

*in a continuous system**
featuring the J-C
ZENITH PRESS WASHER





ECONOMY IN MATERIALS OF CONSTRUCTION
J-C Zenith Press saves valuable floor space, occupies only a 5 ft. square.

SAFE, SIMPLE OPERATION
J-C Zenith Press is fully automatic.

ECONOMY IN OPERATING LABOR
J-C Press eliminates the need for an operator.

ECONOMY IN WATER
J-C Zenith Press operates successfully at 8% consistency instead of the 1 to 1½% of conventional systems.

ECONOMY IN HEAT
J-C Zenith Press adds steam after pulp has reached high consistency.

ECONOMY IN POWER
J-C Zenith Press uses no vacuum pump or other auxiliaries. Only 1/9th the quantity of water circulated makes possible savings in smaller motors and pumps.

GETS PULP CLEANER

* *Pat. Applied for*

For additional information write Dept. PI

J-C

A PRODUCT OF

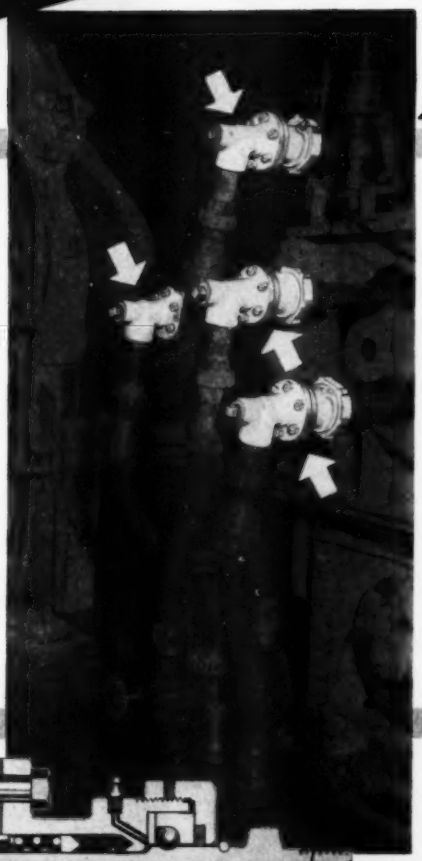
JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN

WORK WELL DONE SINCE '81

"Your JOINTS really solved a Problem for us!"

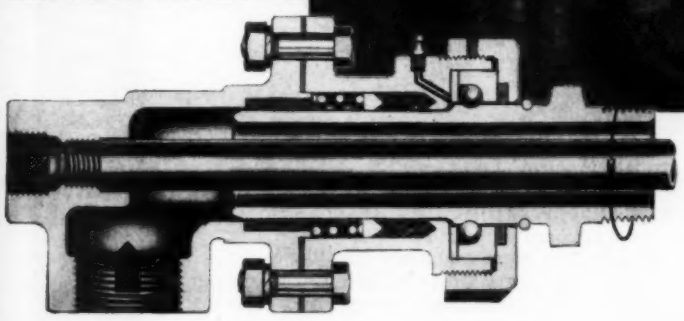
Says MAINTENANCE ENGINEER in this Paper Converting Plant

- Free-Floating, Low Torque Installations.
- Up to 50% Power Savings.
- Better Temperature Control.
- Low Maintenance, No Adjusting.
- All Parts Easily Accessible.



LOW TORQUE (freedom from friction drag) is the key to Barco's *"free-floating"* revolving joint installations. With this type of installation, Barco offers numerous advantages: power savings as high as 50%... very low maintenance requirements... quick, easy accessibility of parts... better temperature control... ability to withstand vibration and hard usage.

Take a look at Barco's new Type IBR Revolving Joint. Note the wide spacing between bearings which holds bearing loads and wear to a minimum. *Let us give you the complete story; ask for recommendations.* BARCO MANUFACTURING CO., 1826 B Winnemac Ave., Chicago 40, Ill. In Canada: The Holden Co., Ltd.



Left: Ability to stand up under high speed, continuous duty on large and small coating rolls has made these Barco Joints popular with the user.

For complete information on this new Type IBR Revolving Joint, send for Bulletin 300.

BARCO *Revolving* JOINTS

For Paper Machine Dryers, Calenders, Paper Converting Equipment

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

LIFTS LOGS like MATCHES

UP—UP—UP she goes, logs held secure by the skid loader's claw-like top grab arm. Here in Crown Zellerbach's mill yard the ground is covered with slippery ground-up bark and waste, but the International crawler gets plenty of traction.

INTERNATIONAL CRAWLER WITH SKID LOADER SOLVES CORDWOOD PROBLEM FOR BIG WASHINGTON MILL

When it comes to moving logs around, there's nothing made to match a skid loader mounted on a rugged International crawler—a team that caught the eye of Crown Zellerbach Corp., Camas, Washington.

This big paper producer got a TD-14A crawler with a skid loader on it, set it to handling the cordwood. The TD-14A and skid loader moved these 8, 16 and 20-foot logs so fast and efficiently that Crown Zellerbach soon bought two more machines just like it.

Now the three units handle 300 cords per 16-hour day, unloading the logs and carrying them to the storage pile, or moving them from the pile to the saws—with round trips ranging from 500 to 2,300 feet.

See this fast-moving, large-capacity outfit for yourself. Let your International Industrial Distributor put International "*Power that Pays*" to work for you!

INTERNATIONAL HARVESTER

INTERNATIONAL

POWER THAT PAYS

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 33 • NUMBER 10 • JANUARY, 1952

Features . . .

Canada to receive sulphur on same basis as U.S. industry.....1147
Hudson opens $10 million Florida plant.....1148
How to use algin for surface sizing and surface control.....1176
by V. V. Vallandigham, A. L. Magnuson and A. Miller
Abitibi's Thunder Bay mill installs new water system.....1178
How vacuum washers improve efficiency of deinking and bleaching operations.....1180
by H. A. Morrison
Mando modernizes.....1182
Wisconsin's forest inventory.....1185
How to determine battery requirements for electric trucks.....1186
by J. E. Vaughan
Sodium chlorate . . . how to handle it safely.....1187
by R. Mattair
Power supply—hydro, steam, or purchased.....1188
by David Moffat Myers
Fiber studies contributing to the differential shrinkage of cellulose.....1189
by George J. Ritter and R. L. Mitchell
How to make the most of storage heighth.....1193
Centrifugal Pumps—Part 18.....1194
by Igor J. Karassik and Roy Carter

News . . .

News of the Industry.....1147
Association News.....1201
Names in the News.....1209
Necrology.....1214
Safety News.....1216

Departments . . .

Editorial.....1137
Current Comment.....1139
Financial reports.....1139
Paper Sketches.....1199
Coming Events.....1206
Practical Shorts.....1221
Foreign Abstracts.....1222
New Products.....1227
New Literature.....1232
Current Market Quotations.....1238
Index to Advertisers.....1240

THE PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index**. An index to each volume is issued annually by the publisher as a part of the April number.

Copyright 1952, by Fritz Publications, Inc.

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

Publication Staff:
President and General Manager
A. SCOTT DOWD

Vice President and Treasurer
A. C. L. FRITZ

Secretary
A. C. BRUCE

News Editor
D. W. ZEIGLER

Production Manager
EDGAR C. FARREN

Circulation Manager
STANLEY E. BOIE

Circulation Field Representative
C. J. ELWELL

Advertising Representatives:
CHICAGO 5: **John D. Henderson,** 431 South Dearborn Street, Wabash 2-3543.

NEW YORK 20: **L. S. van Nydeck,** 9 Rockefeller Plaza, Circle 7-3085.

NEW YORK 25: **H. A. Johnston,** 945 West End Avenue, Academy 2-6984.

BOSTON 16: **Meade & Company,** 471 Statler Building, Liberty 2-9677.

CLEVELAND: **L. M. Perkins,** 1199 Dorsh Road, South Euclid 21, Ohio, Evergreen 1-3232.

LOS ANGELES 14: **Murray Bothwell,** 412 West Sixth Street, Vandike 5875.

PORTLAND: **Murray Bothwell,** 412 West Sixth Street, Los Angeles 14, Calif., Vandike 5875.

SEATTLE 4: **Arthur G. Neitz,** 914 Second Avenue, Eliot 1769.

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 404 North Wesley Avenue, Mount Morris, Illinois.

Address all correspondence intended for publication to Editorial and Executive Office, 431 South Dearborn Street, Chicago 5, Illinois.

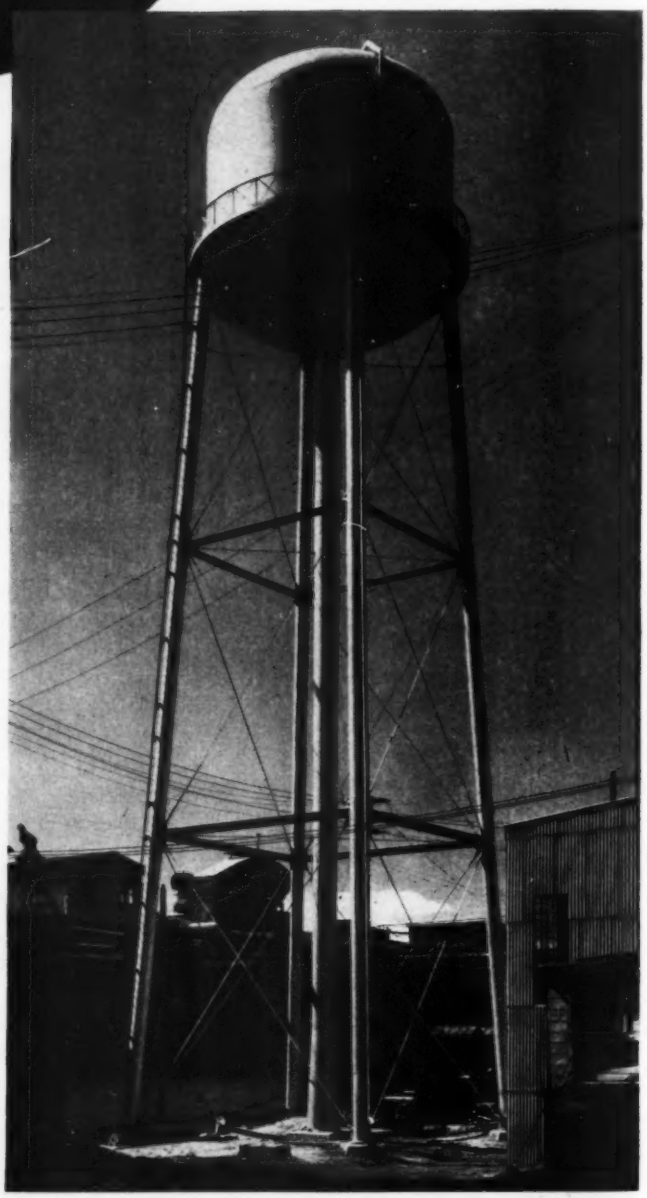
Member: Audit Bureau of Circulations, The Associated Business Publications.

Entered as second class matter December 13, 1948, at the post office at Mount Morris, Illinois, under the Act of March 3, 1879.

Subscription rates: United States, U. S. Possessions, and Canada, $3.00 for one year, $5.00 for two years, $6.00 for three years. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.

A WATER SUPPLY THAT'S *ALWAYS* READY WHEN YOU NEED IT

The 125,000-gal. Horton elevated water tank at the Dunn Paper Company is 100 ft. to bottom. A portion of its capacity is used to supply process water and the remainder is held in reserve at all times for fire protection.



The Dunn Paper Company—manufacturers of machine glazed bleached, semi-bleached, and unbleached sulphite and kraft specialties—recently installed the Horton elevated tank shown on the right at their Port Huron, Michigan plant. This 125,000-gal. steel structure supplies water for fire protection and also for various paper making processes.

Like many plants, Dunn Paper Company, installed an *elevated* tank to provide a *dependable* supply of water whenever it is needed and to guard against interruptions in production. These are proven advantages of an elevated water supply backed by gravity pressure. Service is assured 24 hours a day!

Horton elevated water tanks with ellipsoidal-bottoms are built in standard capacities from 15,000 to 500,000 gallons and Horton Waterspheres in sizes from 25,000 to 250,000 gallons. The welded steel construction of Horton tanks provides smoother surfaces for easier painting. Maintenance is reduced to a minimum.

Horton tanks providing gravity pressure for automatic sprinkler systems are built to meet the requirements of either the National Board of Fire Underwriters, the Inspection Department of the Associated Factory Mutual Fire Insurance Companies or the Factory Insurance Association, as required.

For more information or quotations on Horton elevated tanks and their profitable application in your plant for either general service or fire protection—write our nearest office without obligation. Please include type of service desired, height to bottom, capacity and location.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Guildhall Building
Detroit, 26.....1566 Lafayette Building
Havana.....402 Abreu Building
Houston, 2.....2143 C & I Life Building
Los Angeles, 17.....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3.....1653—1700 Walnut Street Building
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building
Washington 6, D.C.....1138 Cafritz Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

Since 1883

FOR REALLY *TOUGH* PAINT JOBS

TROPICAL

heavy-duty

MAINTENANCE PAINTS

Do you have a really tough maintenance paint job? To thousands of maintenance men and plant managers just such a problem paint job was their first introduction to the remarkable durability of Tropical paints . . . which are formulated strictly for heavy-duty maintenance service. There is a complete line of fresh-mixed Tropical paints, each designed to give superior performance. Whether the application must resist acid fumes, alkalis, rust or heat—on metal, masonry, wood or concrete—on floors, walls, ceilings, roofs, machines or equipment, the right Tropical paint has proved it can do the job better! To select the right paint for the job, in the right quantity, and for correct method of application, use the expert service of the Tropical maintenance paint specialist in your community. Write us today!

PAPER MILLS GET EXTRA SERVICE from TROPICAL

A big percentage of America's paper mills have proved the superior performance obtained from Tropical paints. On pulp tank and paper beaters, where ordinary maintenance paints are soon destroyed, Tropical finishes give many times the service. On machinery, on structural steel and masonry—wherever acids, fumes and moisture call for extra resistance, they specify Tropical!

Since 1883

HEAVY-DUTY MAINTENANCE PAINTS

TROPICAL

SUBSIDIARY OF PARKER RUST PROOF COMPANY

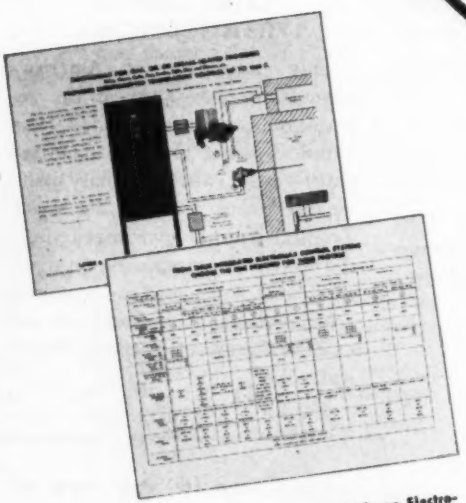
MAKERS OF Bonderite QUALITY CORROSION RESISTANT

FREE! **Send for your copy of the "Industrial Paint Index"—a quick, convenient reference chart for a multitude of maintenance paint applications.**

TROPICAL PAINT & OIL COMPANY • 1116-1300 West 70th St., Cleveland 2, Ohio

Dependable temperature control to 1000 F

Connection between the instrument and its primary element (a Thermohm temperature detector) is wire . . . not tubing. Can be any length without affecting accuracy or dependability.



Typical samples of the information available on Electromax Control. Specify nature of process and whether fuel is gas, oil, steam or electricity.

ELECTROMAX Controllers give modern electronic regulation to thousands of important manufacturing processes. In any application up to 1000 F they exactly fill the bill for non-recording controllers of outstanding dependability.

Electromax has the sensitivity, accuracy and dependability of its big brother Speedomax Recording Controller. Likewise, it is not affected by vibration or building tremors . . . can even be mounted on the frame of a molding press. The instrument needs almost no attention, because it has only one moving part . . . a covered plug-in type relay. There's usually no need to open the instrument door for months at a time.

Electromax Control is available to provide any one of three control actions. For the more simple process requirements, on-off or two position control is usually used. For processes requiring control within unusually close limits, two different types of proportional control are available . . . Position-Adjusting Type and Duration-Adjusting Type. All three types of control action can be applied to electric, steam or fuel heating.

For further information, write our nearest office, or 4974 Stenton Ave., Phila. 44, Penna.

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

Jrl Ad ND47(2)

Why SUTHERLAND precision?

Manufactured in the United States by Valley Iron Works Company, Appleton, Wisconsin.

The maximum deviation across the discs of this 42-inch Sutherland Continuous Beater is only two thousandths of an inch. And in addition to this precision machining, all parts are assembled to minimum tolerances. Why is this eleven-ton machine made so carefully . . . how does this accuracy pay off in your mill?

Most important, it assures you of a degree of uniformity in stock preparation that is otherwise impossible to attain. By means of inlet pressure and power readings, your operators can quickly reset Sutherlands to get desired stock characteristics. Furthermore, these machines are built to give you this precision-control year after year. Records in Southern kraft mills show that total maintenance costs, including disc replacement after fifteen years, are *less than five cents per ton.*

Write today for a copy of "Modern Stock Preparation," and get the complete story on solid satisfaction with Sutherlands.

SUTHERLAND

continuous beating systems

Designed, Engineered, Serviced

***by* SUTHERLAND REFINER CORPORATION**

TRENTON 8, N. J.

HAM FELTZ says:

It ain't what I call waterproof

She must be the wife of a mill man—I kin tell by her winter coat. She had it made from a Hamilton Felt that had outlived its usefulness on a paper machine. Money can't buy better material—all wool, soft, warm and pre-shrunk.

But it ain't waterproof. A hard rain will run through the spaces between the threads as fast as water runs through them when the nip of the press grabs a Hamilton Felt from the wire cloth.

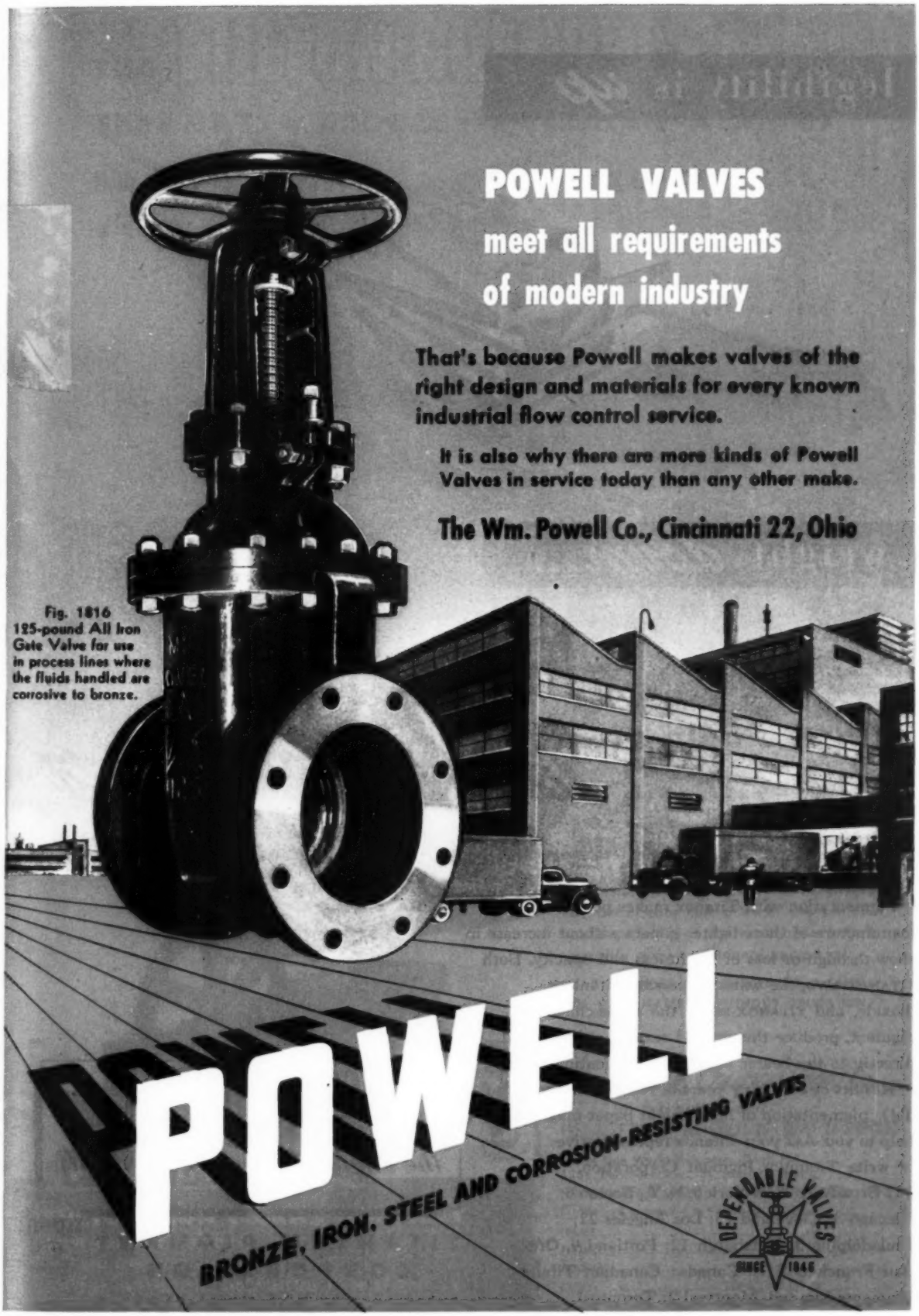
If it's a raincoat you're after, you better talk to the man in the department store. But for makin' paper or board fast and cheap—talk to the Hamilton Felt man.

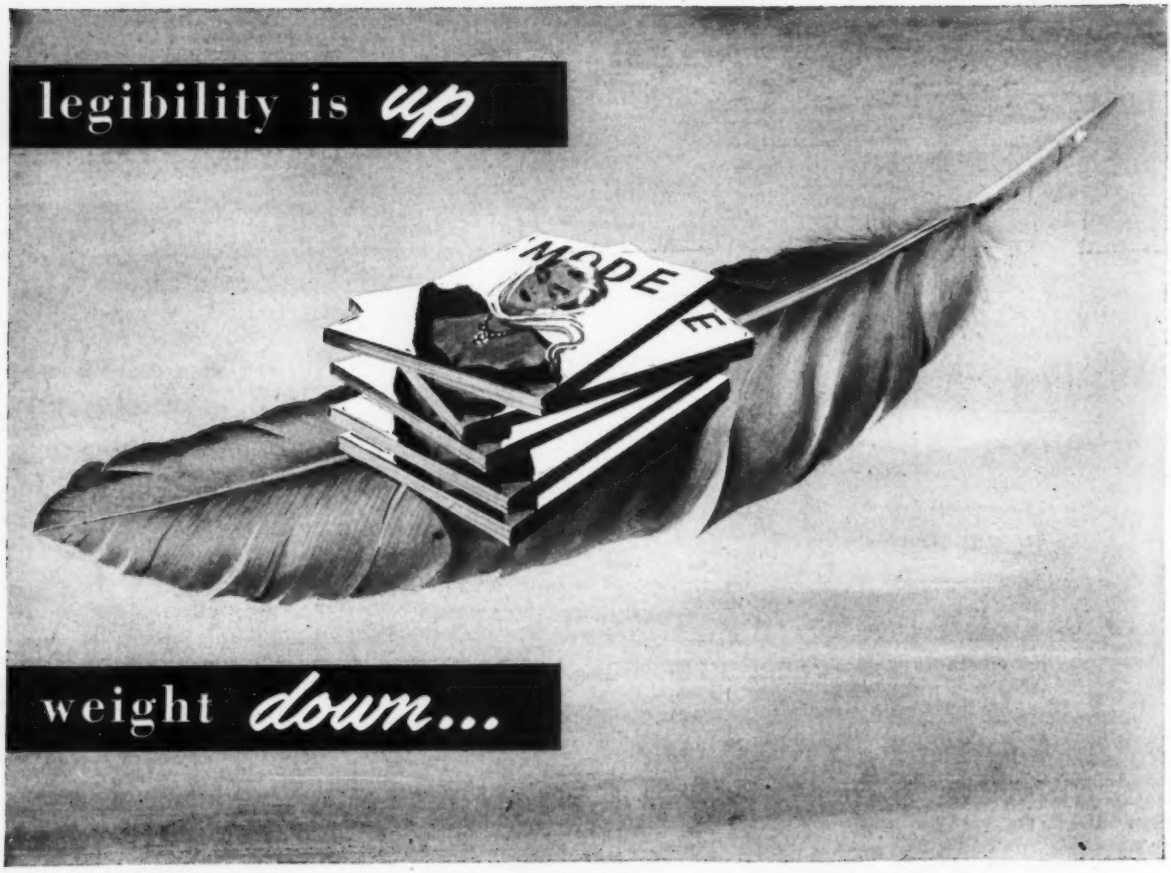
From the thinnest tissue to the heaviest board, there is a Hamilton Felt that will do your work better, faster and at lower cost.

Hamilton Felts

MIAMI WOOLEN MILLS *Established 1858*

SHULER & BENNINGHOFEN, HAMILTON, OHIO


POWELL VALVES
meet all requirements
of modern industry
That's because Powell makes valves of the right design and materials for every known industrial flow control service.
It is also why there are more kinds of Powell Valves in service today than any other make.
The Wm. Powell Co., Cincinnati 22, Ohio
Fig. 1816
125-pound All Iron
Gate Valve for use
in process lines where
the fluids handled are
corrosive to bronze.
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES
DEPENDABLE VALVES
SINCE 1846



with the help of *Titanox Pigments*

Ever-increasing postal rates continue to expand the demand for lighter weight paper.

Pigmentation with Titanox makes possible the manufacture of these lighter papers without increase in show-through or loss of brightness and opacity. Both TITANOX-AWD, the water dispersible titanium dioxide, and TITANOX-RCHT, the rutile-calcium pigment, produce this desired result—either added directly to the beater or used in the coating.

Results of our many years of research in the TiO_2 pigmentation of light-weight paper may be of help to you. Ask your Titanox representative or write Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

9644

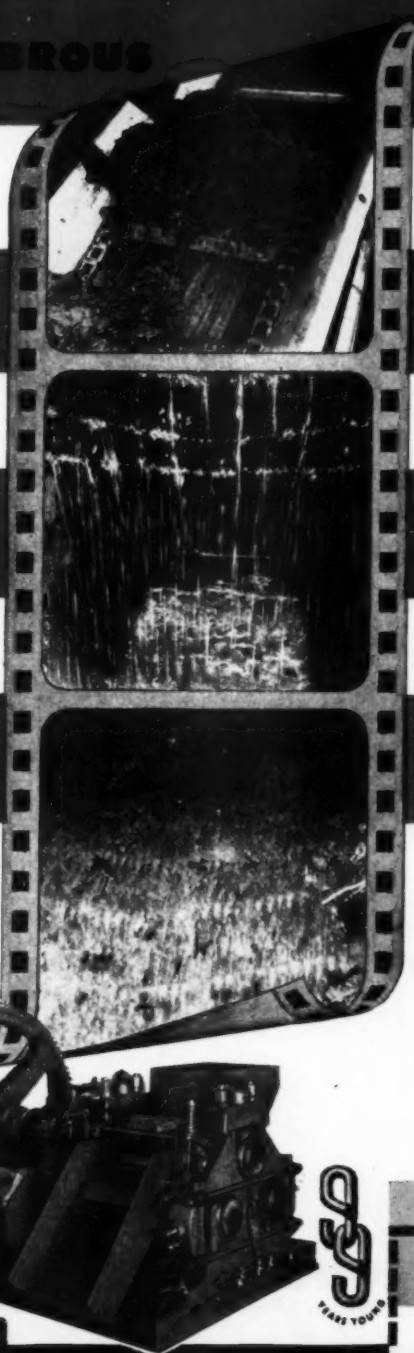
TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

THE FULTON ROLL PRESS WILL SEPARATE — REDUCE — DEWATER ALMOST ANY FIBROUS MATERIAL . . .



MORE QUICKLY

Continuous Conveyor Feed

. . . in one CONTINUOUS operation, far faster than conventional, costly "batch" methods.

MORE THOROUGHLY

Reduction,

. . . thoroughly separates and reduces fibres . . . lowers moisture content of most fibrous materials to 50% or less.

De-watering

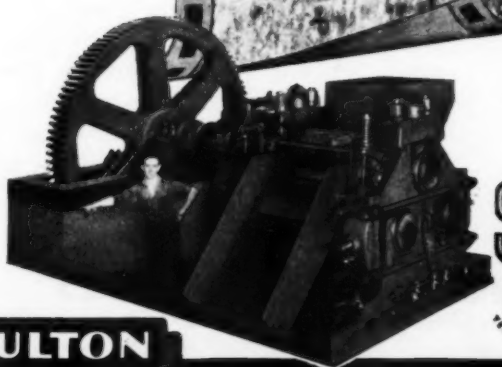
MORE ECONOMICALLY

. . . Saves labor . . . power . . . handling equipment . . . water . . . chemicals . . . maintenance.

Continuous Delivery

Whatever your fibre-processing problem, it will pay you to investigate the FULTON Roll Press. This remarkable machine, perfected by the world's leading builder of cane mills after 99 years of experience, *will give you results never before possible with conventional equipment.*

MAY WE PROVE IT BY PROCESSING A SAMPLE OF YOUR MATERIAL WITHOUT OBLIGATION?



FULTON

FULTON IRON WORKS COMPANY

SAINT LOUIS 14, MISSOURI

New York Office: 82 Wall St., New York 5

MAKERS OF FINE PROCESSING AND EXTRACTION EQUIPMENT SINCE 1852

Mail Coupon Now!

for full details and FREE TEST RUN OF MATERIALS YOU WANT TO PROCESS

Fulton Iron Works Company, *Dept. 152*
1259 Delaware Ave., St. Louis 14, Mo.

Please send full details of FULTON ROLL PRESS

☐ **We are interested in FREE test run of.....**

NAME.....

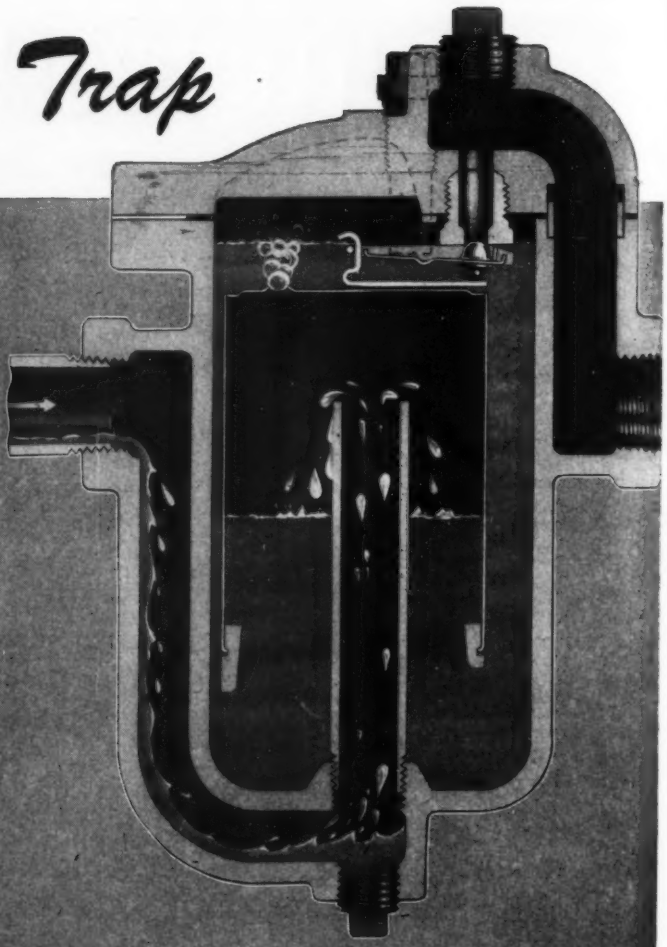
FIRM.....

ADDRESS.....

CITY.....ZONE.....STATE.....

This Steam Trap

MEETS THE REQUIREMENTS of Paper Machine Drainage



1. FAST VENTING OF AIR

2. LOW MAINTENANCE

STEAM traps haven't always worked so well for draining paper machines. First, they wouldn't vent air fast enough, so that heat-up was slow after the machine had been down. Second, they didn't wear too well.

The Armstrong No. 813D steam trap was designed to answer these objections. That it does has been proved by many mills with individual 813D traps on each dryer.

Large air venting capacity is secured with oversize bucket vents.

Long life with infrequent maintenance has been secured by:

1. An extended inlet tube which admits condensate, steam and air into the trap above the water level in the bucket. This eliminates excessive wear-producing agitation of the mechanism.

2. Chrome steel valve and seat — hardened, ground and lapped — same as used in traps for 900°F., 950 psig. All other working parts 18-8 stainless steel, heavily reinforced for wear.

With this trap you get all the advantages of simplicity, economy, dependability and fast drainage with none of the previous disadvantages. SEND FOR BULLETIN No. 205.

ARMSTRONG MACHINE WORKS
816 Hoffman Street, Three Rivers, Michigan

ARMSTRONG

Moisture Control Systems
Individual Dryer Temperature Controls
Paper Machine Drainage Traps
Inverted Bucket Steam Traps
Steam Humidifiers

Hooperwood Dryer Felts—cotton or asbestos—are engineered for the job they have to do. Whether the product is kraft, writing, newsprint, linerboard, book, or a specialty, there's a Hooperwood Dryer Felt made just for that job. Write WM. E. HOOPER & SONS COMPANY, Juniper and Cherry Streets, Philadelphia 7 • Mills: Woodberry, Baltimore 11.

Camachine Type 18 is one of the four great Camachine mill-type winders. The Type 18 is dynamically balanced to the maximum speed of 2500 fpm. The Type 18 may be built to your choice of 42", 60" or 72" maximum rewind diameter, for trim widths ranging from 73" to 150". The Type 18 may be equipped for score-cut slitting, using air-operated slitter units, or for shear-cut slitting.

Send for Bulletin 3010

CAMERON MACHINE COMPANY
61 Poplar Street, Brooklyn 2, New York

Consider the SPEED

The four great mill-type Camachines (Types 14, 18, 19 and 20) offer a choice of maximum speeds ranging from 1800 fpm on Type 14 to 5000 fpm on Type 20, depending upon characteristics of the material, number of cuts, web tension and machine width.

Consider the ECONOMY

Four great, job-proved mill winders offer you a choice of the model best suited for low-cost, dependable performance in your plant. That's one good reason why more than 400 paper and paperboard mills in the United States have chosen Camachines.

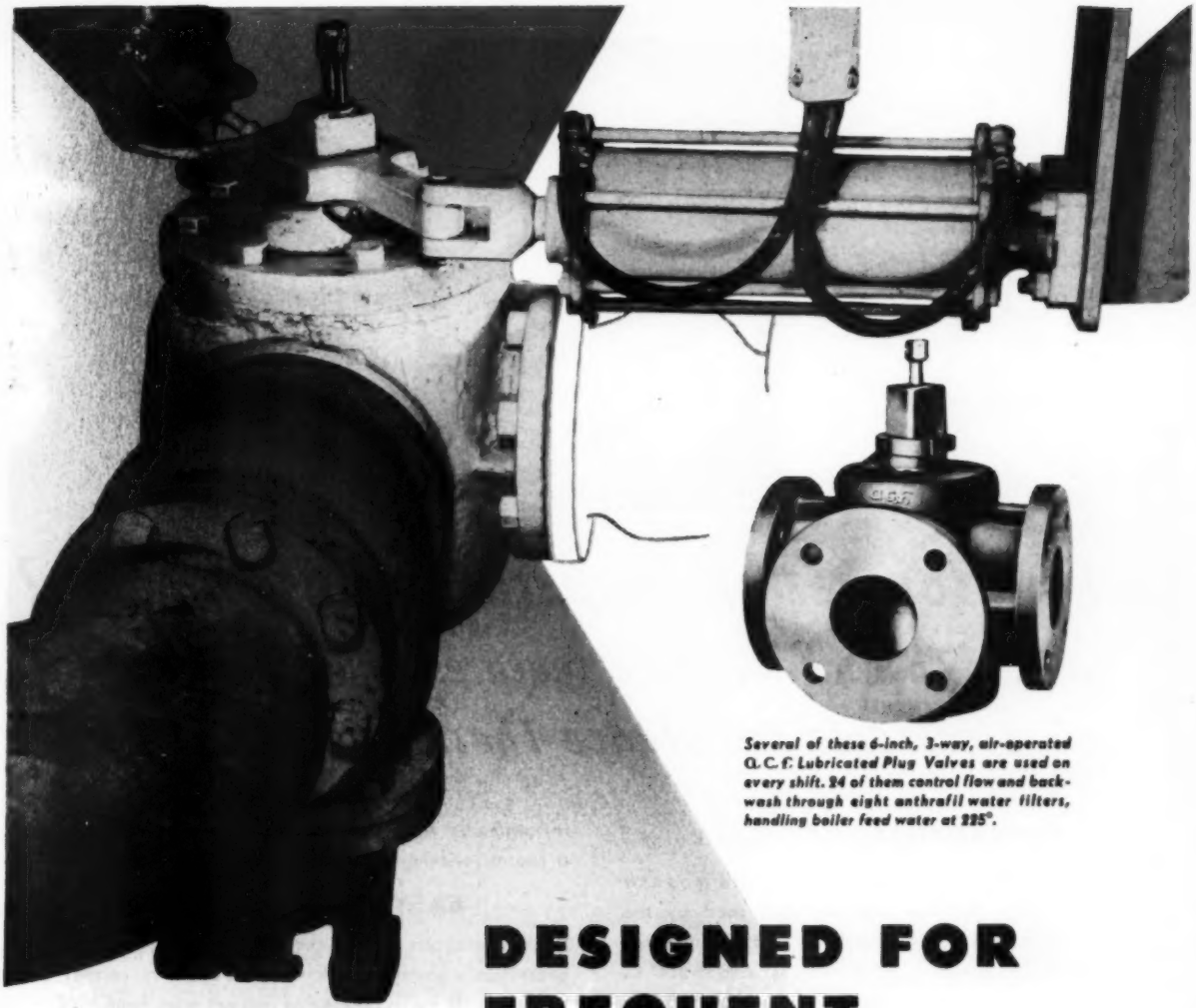
Consider the VERSATILITY

Rolls produced on Camachines include over 80 different product classifications of paper and paperboard, from newsprint to roofing paper, in trim widths ranging from 53" to 310".

Consider the ROLL QUALITY

Automatic counterweighting, sensitive tension controls, built-in alignment, and dynamic balance are among the many features which assure clean-cut uniformly wound, top-quality rolls in all mill type Camachines.

Consider the FACTS and you'll wind up with Camachines®



Several of these 6-inch, 3-way, air-operated a.c.f. Lubricated Plug Valves are used on every shift. 24 of them control flow and backwash through eight anthrafil water filters, handling boiler feed water at 225°.

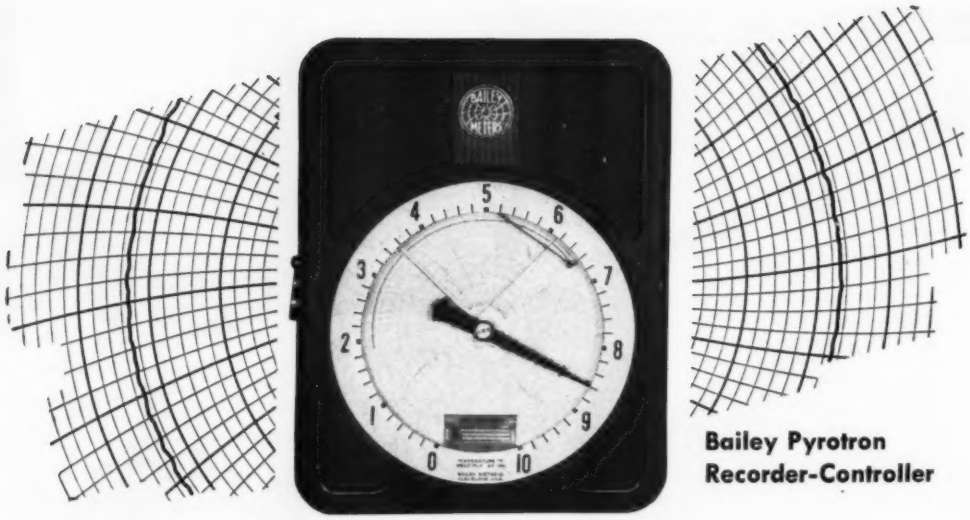
DESIGNED FOR FREQUENT OPERATION

When a valve has to be opened and closed several times a day, the right valve may save you many production delays. With air-operated a.c.f. Lubricated Plug Valves, you're sure of fast, easy operation every time. The exclusive a.c.f. CYLINDRICAL plug, being untapered, does not wedge in its seat. Besides, it only takes a quick quarter-turn to open wide or close tight. For speed and 365-day-a-year dependability... a.c.f. CYLINDRICAL Lubricated Plug Valves!

a.c.f. CYLINDRICAL FULL PIPE AREA **PLUG VALVES**

Representatives in more than 50 principal cities

Ask for Catalog 4-PI, American Car and Foundry Company, Valve Division, 1501 East Ferry Avenue, Detroit 11, Michigan



Bailey Pyrotron
Recorder-Controller

Looking for Better Temperature Instruments?

...Then check these features of Pyrotron Electronic Resistance Thermometers...

FUNDAMENTAL ACCURACY

Bailey Pyrotron Resistance Elements are made of highest purity platinum—the material used by the National Bureau of Standards in establishing basic standards for temperatures from −190°C to +660°C.

THREE TYPES OF CONTROL

Pyrotron Controllers may operate: on-off electrical systems by either electronic relays or electric contacts, modulated electronic systems, or air-operated systems. Two temperatures may be recorded on the same chart and controlled by a single instrument.

FACTS PUT INTO USABLE FORM

Bailey Pyrotrons may be arranged to put temperature facts into convenient usable forms. If two or more temperatures are related, they may be recorded as continuous records on the same chart for easy comparison. The average of several temperatures or the difference between two temperatures may be recorded as a single continuous record which may be retransmitted to a distant point or used to actuate a control system.

EASY INSTALLATION

Bailey Pyrotrons do not require careful leveling or protection against vibration. Three ordinary copper wires are all that is needed to connect each temperature sensitive element with the recorder. Power may be taken from any 115 volt 60 cycle circuit.

MINIMUM MAINTENANCE

The absence of galvanometers, batteries and standardizing equipment, together with the use of interchangeable unit assemblies, reduces Pyrotron maintenance to the vanishing point.

ABUNDANT POWER

A separate motor drive for each temperature furnishes abundant power to operate a recording pen, a controller and an alarm switch.

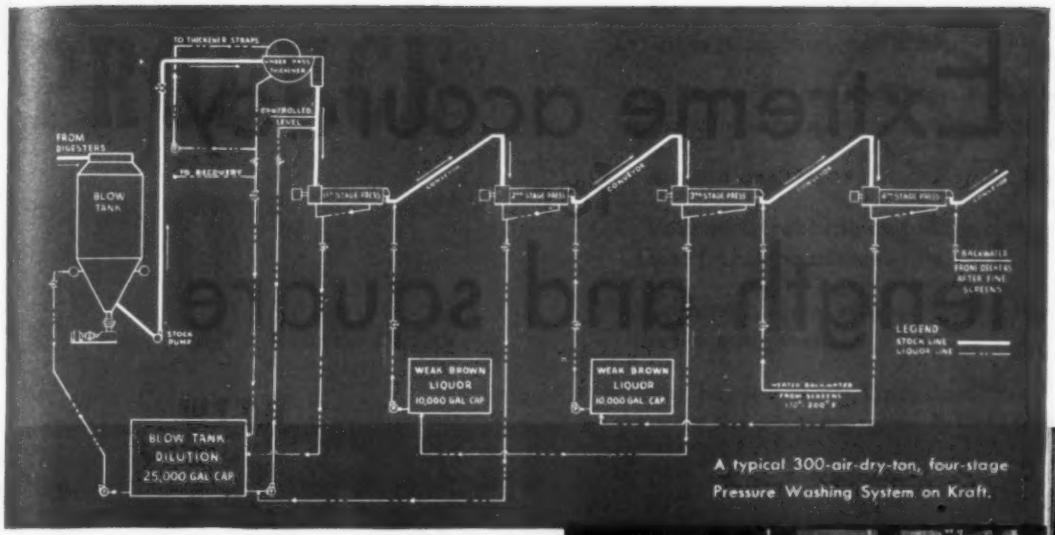
For the full story on this unusual electronic resistance thermometer which is suitable for ranges between −300°F and 1200°F, ask for Bulletin No. 230-C. P-21

BAILEY METER COMPANY

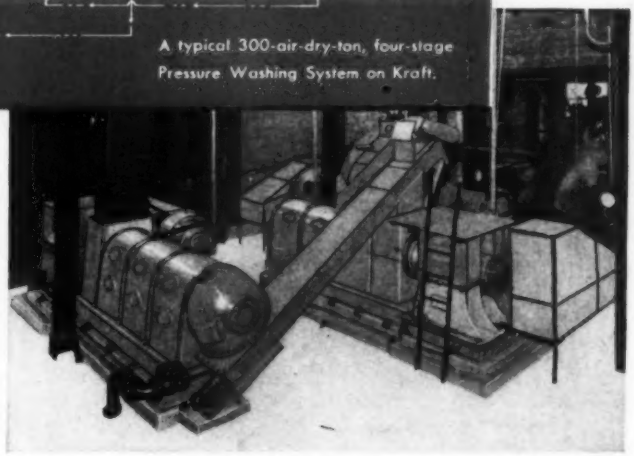
1058 IVANHOE ROAD • • • CLEVELAND 10, OHIO

Controls for Processing

TEMPERATURE
PRESSURE
% OXYGEN
% COMBUSTION
FLOW
LEVEL
DENSITY
RATIO



A typical 300-air-dry-ton, four-stage Pressure Washing System on Kraft.



A major advance in pulp mill technology

It took a good many years and a lot of hard thinking to develop the Pressure Washing System, but the men who've seen it work agree that the results are well worth the effort. Pulps that are washed this new way are not only clean enough to meet any specifications, but are definitely stronger as a result of the intense rubbing action and pressure they undergo. Also, Pressure Washing offers possibilities of reducing evaporator costs and stream pollution that cannot be equaled.

Low water consumption ... less than 200 g.p.m. for a 300-ton system.

No foaming ... air is completely excluded from system. No showers, foam-breakers, over-size transfer and settling tanks are needed.

One-man operation ... entire system is controlled by one man from a single switchboard.

Saves space ... all units are small and compact and can be arranged in many ways to conserve space.

Low maintenance ... facing on compression elements has a probable life of at least 100,000 tons and is easily renewable.

Saves power ... actual horsepower consumed by a typical system is only 1.36 per air-dry ton.

Systems can be furnished in two, three, and four stages to fit individual mill requirements.

PRESSURE WASHING

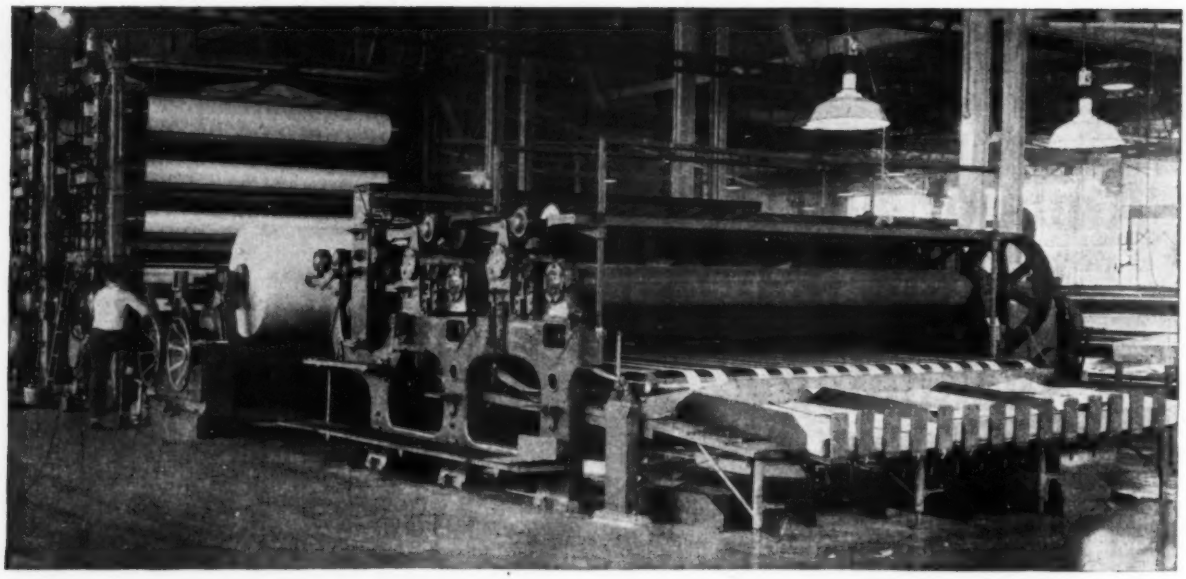
Write for complete information today.

Designed & Engineered by patent pending Sales & Service

SUTHERLAND, Inc. **SUTHERLAND REFINER CORP.**
Trenton 8, N. J.

Manufactured by VALLEY IRON WORKS CO., Appleton, Wisconsin

Extreme accuracy for length and square



The Black-Clawson duplex cutter is a remarkably accurate piece of equipment. Make the required adjustment and sheets will cut to extreme accuracy for length and square.

Heavy, vibrationless construction. Anti-friction bearings for effortless operation.

Revolving and fixed knives heavily trussed to prevent deflection and assure shock-free cutting. Highly sensitive adjustment of stationary knife. Both knives adjustable for squaring of the sheet.

Knives V-belt driven, utilizing heavy fly wheel construction to add extra momentum to cutting action—also to prevent back lash.

Slitter settings quick and accurate. Slitters of shear type to minimize dust accumulation.

Truly accurate cutting for length. Really accurate cutting for square.

Address all inquiries to

BLACK-CLAWSON

HAMILTON, OHIO

Divisions: SHARTLE BROS. MACHINE CO., Middletown, Ohio
DILTS MACHINE WORKS, Fulton, New York
Western Sales Office: Mayer Bldg., Portland, Oregon
Southern Sales Office: 937 Coventry Road, Decatur, Georgia
Associate: THE ALEXANDER FLECK LIMITED, Ottawa, Canada
Subsidiary: B-C INTERNATIONAL, LTD., Greener House
66/68 Haymarket, London, S. W. 1, England

PRODUCE MORE WITH YARWAYS...

Is higher production your aim?

Then Yarway is your steam trap. Best steam trap performance requires condensate drainage *plus*—

1. **Air and gas removal.**
2. **Velocity scrubbing of condensate from heat transfer surfaces.**
3. **Keeping highest average temperature in the equipment.**

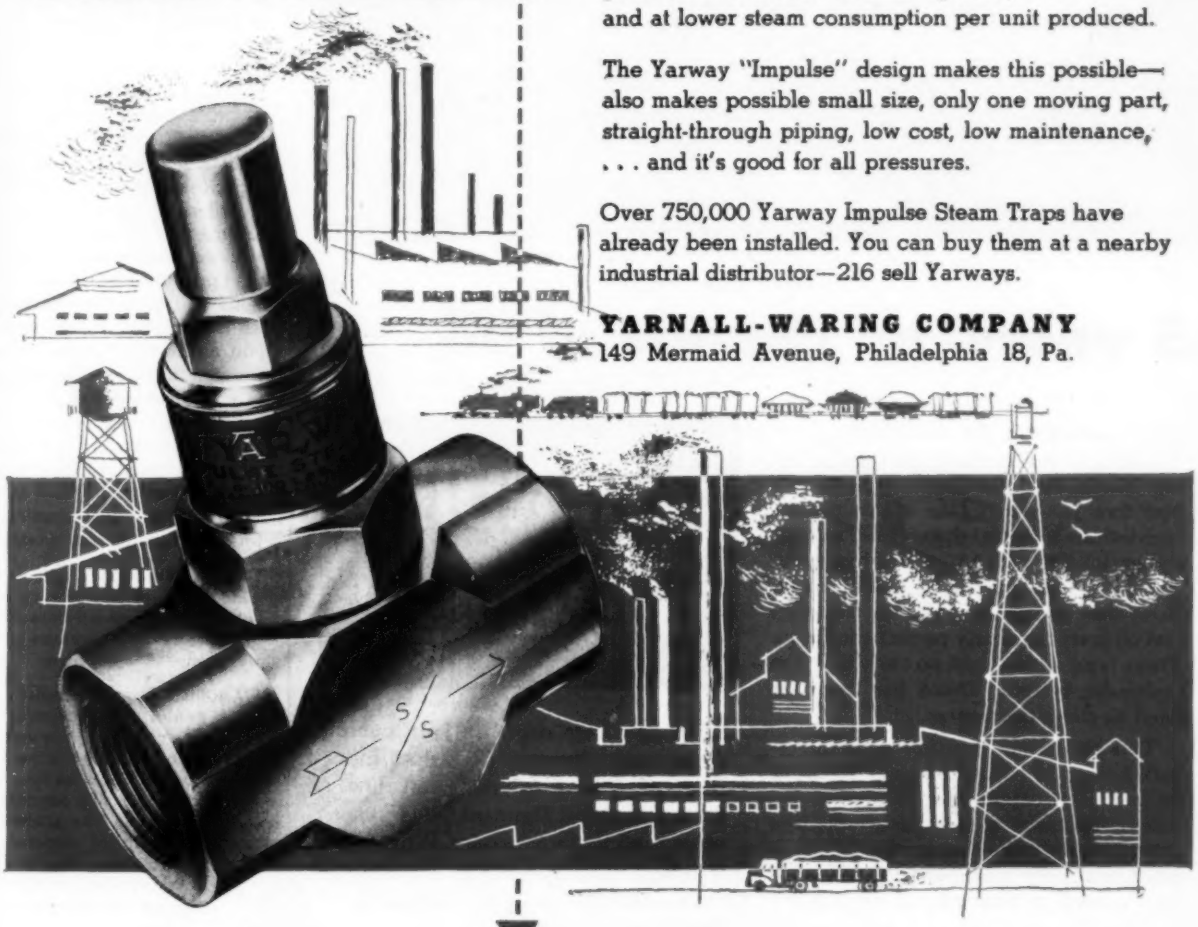
Yarway Impulse Steam Traps do all this, *sending the most premium B.T.U.'s at top temperature into your process or product.*

That's why equipment drained with Yarways gets "hotter, sooner" . . . why better quality and higher production rates are so often reported, and at lower steam consumption per unit produced.

The Yarway "Impulse" design makes this possible—also makes possible small size, only one moving part, straight-through piping, low cost, low maintenance, . . . and it's good for all pressures.

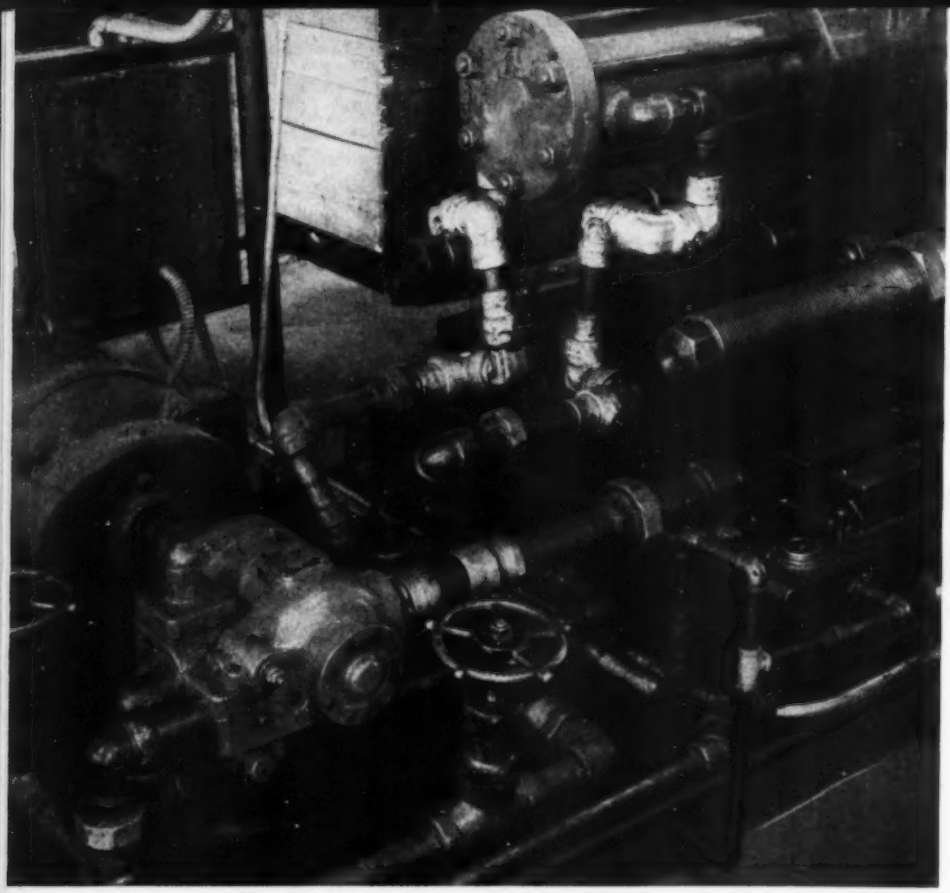
Over 750,000 Yarway Impulse Steam Traps have already been installed. You can buy them at a nearby industrial distributor—216 sell Yarways.

YARNALL-WARING COMPANY
149 Mermaid Avenue, Philadelphia 18, Pa.



FREE OFFER
Don't take our word for it. Test Yarway's production advantages in your own plant, without cost or obligation. Drop us a card. A trial trap will be delivered promptly.

YARWAY the steam trap designed with production in mind



5 years, no change of oil

THIS midwestern die casting company called in a Standard Oil lubrication specialist when operations were started over five years ago. One of his recommendations specified the use of STANOIL Industrial Oil No. 18 in the hydraulic unit of the die casting machine shown. Now, after five years of service, this original oil is still in nearly perfect condition. There is no deposit and no varnish in the hydraulic system. There has been no need to clean the system.

This performance is typical of the results gained by STANOIL users who count on its greater oxidation stability and corrosion resistance to deliver trouble-free lubrication in speed reducers, head stock gears, auxiliary turbines, and compressors, as well as hydraulic systems.

The Standard Oil lubrication specialist in your own area can help put the advantages of versatile STANOIL Industrial Oil to work in your plant now. A call to your local Standard Oil (Indiana) office is all that's necessary. Why not do it today?

Standard Oil Company, 910 South Michigan Ave., Chicago 80, Ill.

STANOIL
TRADE MARK
Industrial Oil

What's your problem?

D. R. Clay, lubrication specialist at Standard Oil's Grand Rapids office, helped this manufacturer put hydraulic system lubrication on a trouble-free basis with STANOIL Industrial Oil.

One of a corps of such specialists, he makes his headquarters close to the plants he serves. He offers on-the-spot lubrication service that is backed by extensive experience and training in the application of modern lubricants and fuels. The same service is available to you wherever you are located in the Midwest through the lubrication specialist in your own locality.

Arrange today for a visit by this specialist. Just phone or write the Standard Oil Company office nearest you. When he calls, ask for actual performance data on these outstanding products:

SUPERLA Greases—Available in a wide range of consistency grades and in both lime-soap and soda-soap types, SUPERLA Greases cover a wide range of operations.

STANORUST Rust Preventives—The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specially developed for its intended use. The grades range from a fingerprint remover to a heavy semi-solid that protects against corrosion for years under the most severe outdoor exposure.

STANDARD OIL COMPANY (STANDARD) *(Indiana)*

ASTEN

dryer felts

Good Company

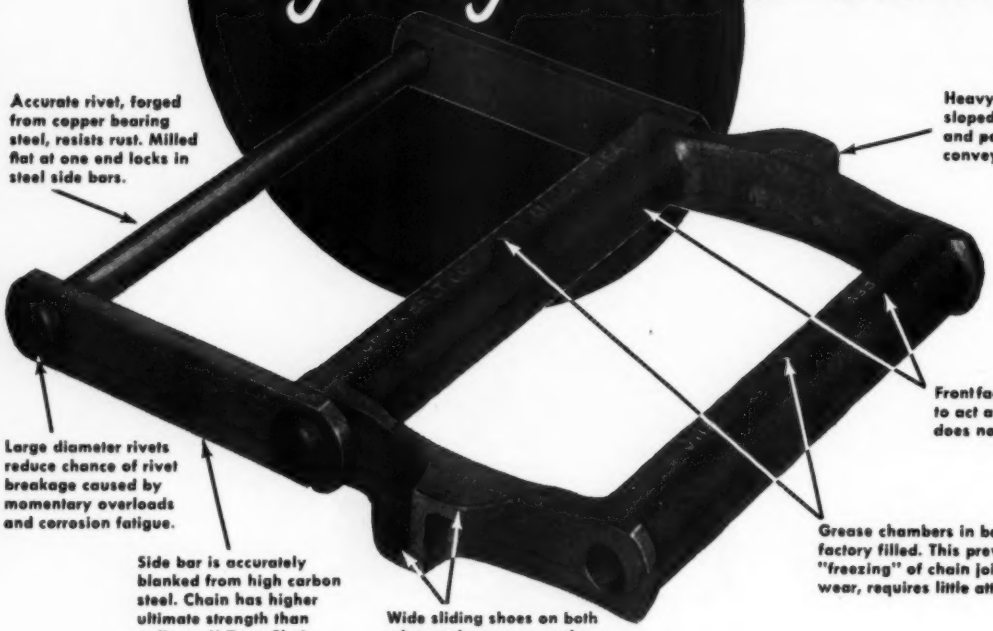
Look into a mill that's just set a new production record or one that's very proud of the quality of its product. Chances are, you'll find that the dryer clothing is ASTEN all the way.

Economy in the long run

ASTEN-HILL MFG. CO.
PHILADELPHIA, PENNA.

ASTEN-HILL, LTD.
VALLEYFIELD, QUEBEC

it's stronger.. it lasts longer... it gives you better service!


Accurate rivet, forged from copper bearing steel, resists rust. Milled flat at one end locks in steel side bars.
Heavy wearing shoes are sloped to avoid catching and possible damage to conveyor.
Front faces of barrels designed to act as scrapers. Material does not pack in the trough.
Large diameter rivets reduce chance of rivet breakage caused by momentary overloads and corrosion fatigue.
Side bar is accurately blanked from high carbon steel. Chain has higher ultimate strength than ordinary H-Type Chain.
Wide sliding shoes on both edges reduce wear on the chain and trough.
Grease chambers in barrels are factory filled. This prevents "freezing" of chain joints, reduces wear, requires little attention.

NEW REX* COMBINATION-TYPE REFUSE CHAIN HAS OUTSTANDING ADVANTAGES

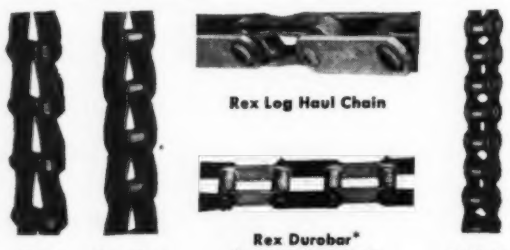
Here's the finest chain for conveying sawdust, refuse, wood chips and similar material.

Rex *Combination-Type* Mill Chain is designed to handle assignments that prove too tough for ordinary H-Type Chain.

Check the captions. Each one points out an important reason why this new chain will give you longer service . . . better service . . . and lower overall costs. What's more, it can easily replace corresponding H-Type Chain, since it operates efficiently over the same sprockets and in the same trough.

For all the facts on this new chain, write to Chain Belt Company, 1714 W. Bruce Street, Milwaukee 4, Wisconsin.

OTHER REX FAVORITES IN THE PULP AND PAPER MILLS



*T.M.Reg.U.S.Pat.Off.

CHAIN BELT REX COMPANY ®

PULP MILL CHAINS

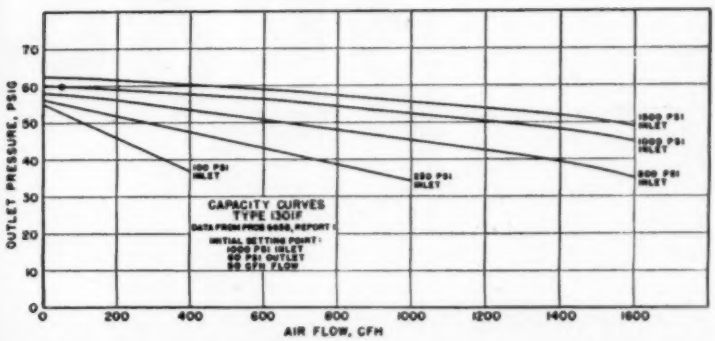
HIGH PRESSURE REDUCING VALVE for AIR or GAS SERVICE

FISHER® TYPE 1301F

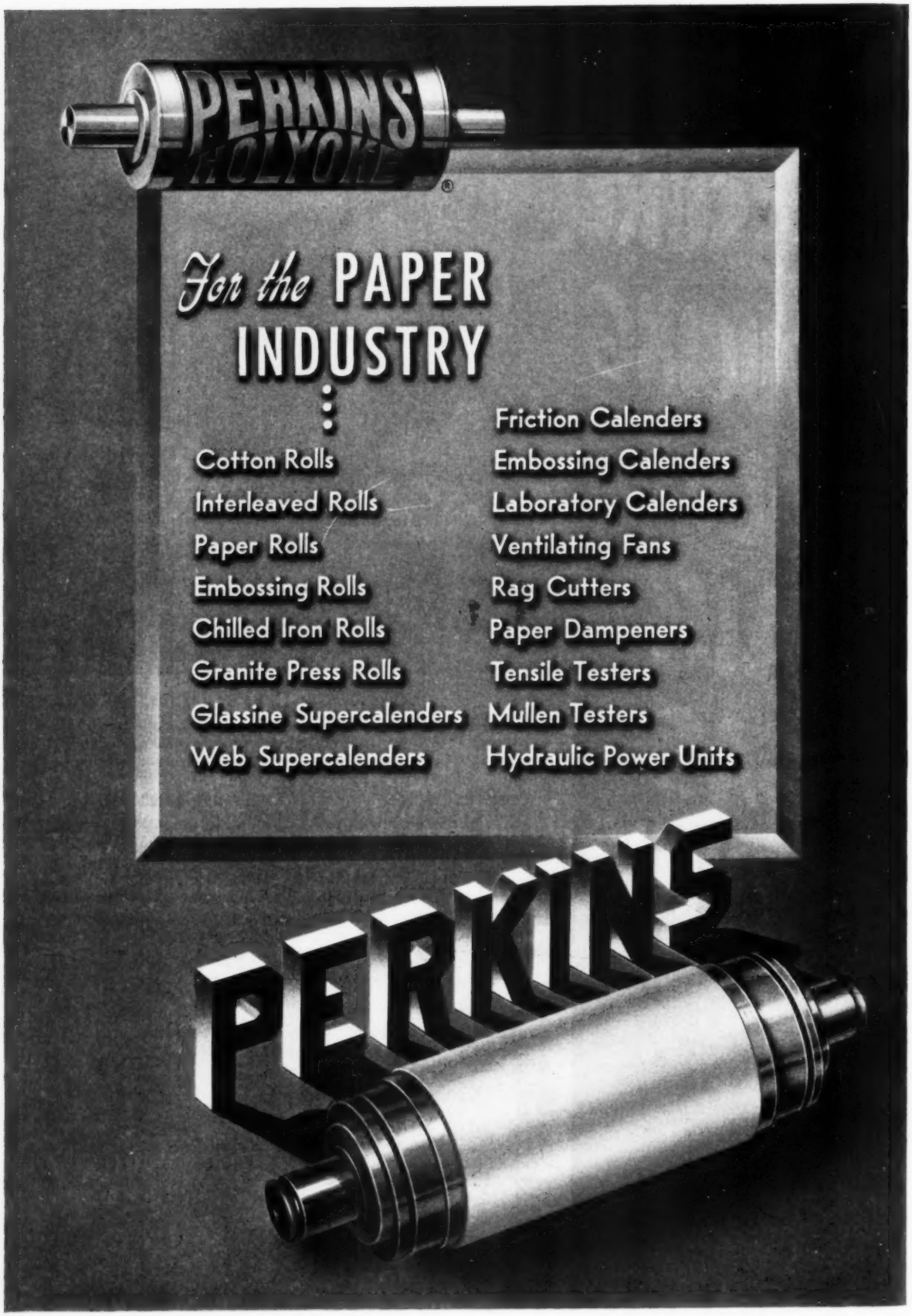
Type 1301F is commonly used in conjunction with pilot operated controllers where high pressure operating medium is used. They are also used in general industrial applications for high pressure reduction of non-corrosive air or gas.

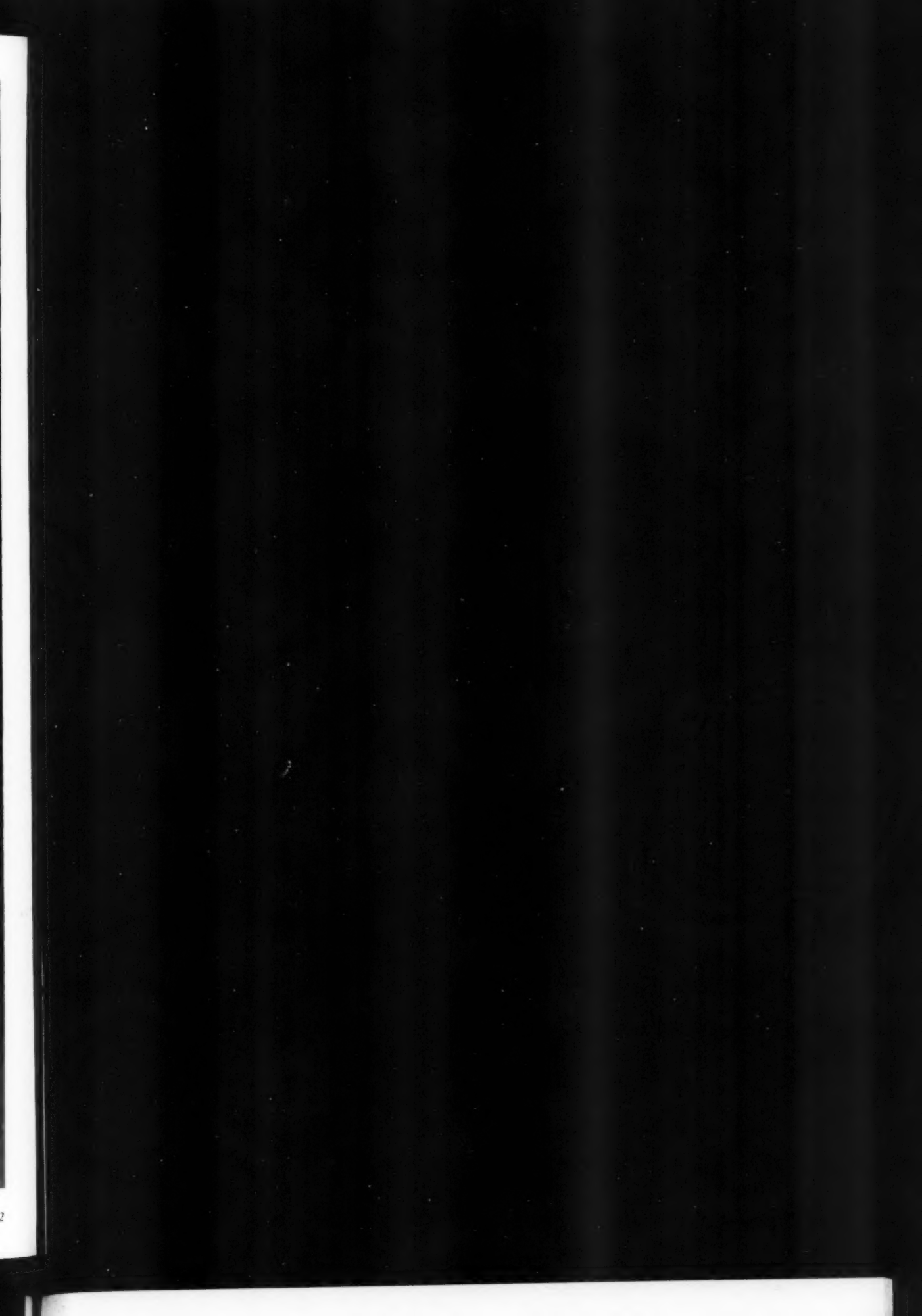
CONSTRUCTION:
All forged bronze construction with glass impregnated Teflon valve disc, stainless steel orifice. Furnished with one inlet connection and two outlet connections of ¼" pipe size.

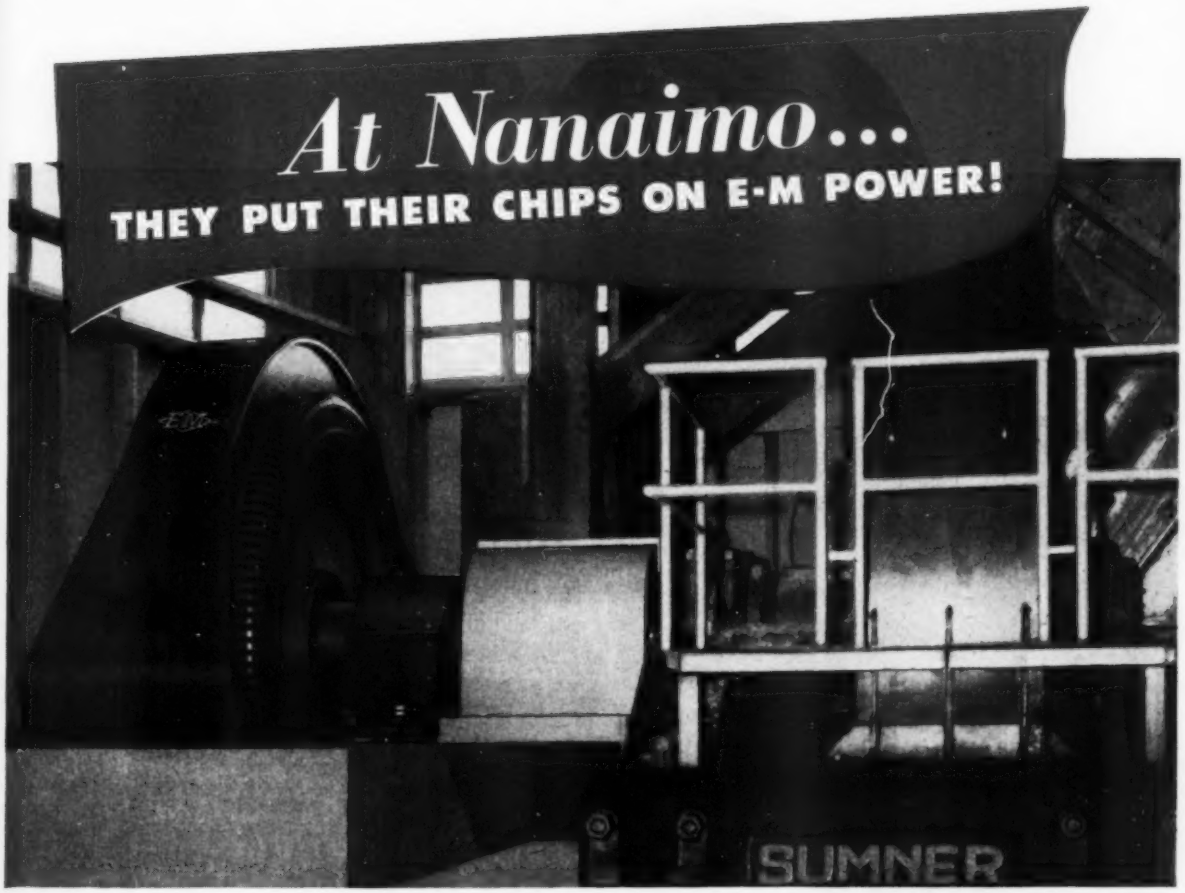
PRESSURE RANGE:
Suitable for inlet pressures up to 3000 PSI; reduced pressure spring ranges of 10 to 75 PSI; 50 to 150 PSI. Adjustment screw for easy adjustment of reduced pressure setting.



FISHER GOVERNOR COMPANY
Marshalltown, Iowa


PERKINS
HOLYOKE
For the PAPER INDUSTRY
Cotton Rolls
Interleaved Rolls
Paper Rolls
Embossing Rolls
Chilled Iron Rolls
Granite Press Rolls
Glassine Supercalenders
Web Supercalenders
Friction Calenders
Embossing Calenders
Laboratory Calenders
Ventilating Fans
Rag Cutters
Paper Dampeners
Tensile Testers
Mullen Testers
Hydraulic Power Units
PERKINS





Whirling knives . . . shocking impact as huge logs hit the disk . . . terrific load as they reduce to chips in seconds . . . this is chipper duty—the toughest assignment any synchronous motor has to face. And this is why tough E-M Synchronous Motors are heavily favored by the paper industry for its chipper drives.

The 1500 hp E-M Synchronous Motor driving the 15 ft. diam. six-knife chipper at the new H. R. MacMillan Export Co., Ltd., Pulp Mill near Nanaimo, British Columbia, is typical of the E-M line of Synchronous Motors specially designed and constructed for chipper duty. Cast steel rotor; heavy, flared back plates; massive box type frame; high thermal capacity cage windings; extra strong coil-end lashings—these E-M features enable the motor to take shocks and tremendous loads with ease and continue to deliver steady, dependable power.

E-M Induction Motor drives pump for hydraulic barking. Also featured in this new mill is the 1250 hp, 3580 rpm E-M Heavy-Duty Induction Motor driving the centrifugal pump which furnishes high pressure water for the hydraulic barker. The same E-M quality engineering insures that this motor, too, will continue to produce steady, dependable drive power so necessary to pulp production. Coils are extra tough and are treated with a special varnish; coil ends are lashed tightly to each other and to rigid bracing rings to prevent movement; the rotor is built especially strong and stiff; the shaft has extra strength.

These motors were built by E-M engineers who thoroughly understand the drive problems of the paper industry and who have been manufacturing motors for pulp and paper mill drives for many years.

For help on your paper mill drives, call the E-M engineer nearest you, or consult the factory. Write for Synchronizer No. 26, the Paper Industry number.

ELECTRIC MACHINERY MFG. COMPANY

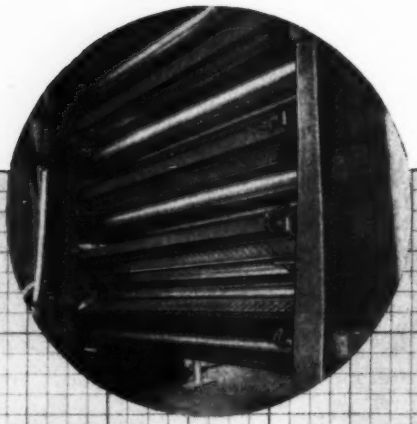
1331 Tyler St., Minneapolis 13, Minnesota, U.S.A.

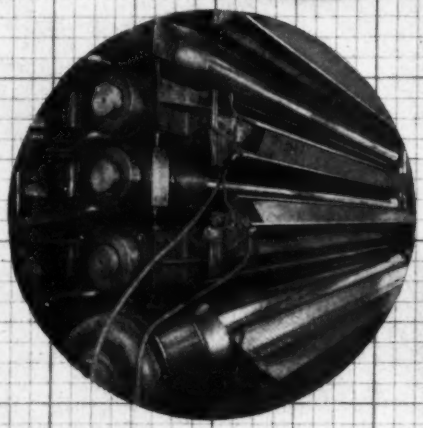
1300-TPA-2096

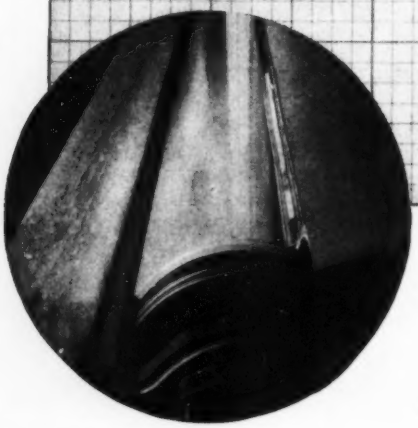
E-M

Specialists in

Big Motor Engineering







For MAXIMUM PRODUCTIVITY from Your Paper Machine You Need VICKERY DOCTORED ROLLS

—and that goes for

breast rolls
wire rolls
press rolls
dryers
calender rolls
super-calender rolls

Vickery Doctors are carefully engineered and applied to assure continuously clean, efficient roll surfaces with minimum effective pressure and without scoring. Ask for layouts and estimates.

BIRD MACHINE COMPANY
South Walpole, Massachusetts

The Paper Industry

January 1952

1951: a record

Paper and paperboard output in the United States during 1951 promised to break all existing records, according to January-October production figures released by the Department of Commerce. Some sources estimate that output for the year would exceed 27,000,000 tons. Even conservative forecasts have placed the total at 26,600,000.

Assuming that the less daring forecasters are correct, the industry during the past year smashed the previous high of 24,300,000 tons established in 1950 by more than 9 per cent. And, looking back over the years, 1951's performance demonstrates the upward climb of a steadily growing industry. A decade ago, in 1941, paper and paperboard production stood at 17,933,000 tons, while in 1931, at the beginning of the depression, the figure was 9,382,000, a contrast to the 11,140,000 tons produced in 1929.

Hampered no little extent by shortages of raw materials such as sulphur, the industry took strides to meet world scarcities. In newsprint, vital to a free press, production jumped almost 10 per cent during the first nine months of 1951 over the corresponding period in 1950. And expansion projects now either under way or on drawing boards promise a narrowing of the gap between production and consumption during 1952.

If necessary construction materials will be made available this year to an industry whose product is vital to the national economy in both war and peace, defense needs and civilian requirements will be met in most paper types. In civilian needs alone, the industry must each year meet an ever-growing demand, for per capita consumption has nearly doubled since 1929 and is growing steadily year by year. Thus, defense economy, or peace—paper manufacture is an industry whose sights can be set just a little higher every new year.

Industry efficiency climbing

With the New Year promising greater production and consumption, the pulp and paper industry continues its quest for ever-improved efficiency. Based on past performance, the industry can expect to better its already high standing in the over-all manufacturing picture.

Recent figures released by the Bureau of Labor Statistics show that during the 12 years from 1939 to 1950 the pulp and paper industry increased its output per production worker by nearly 20 per cent. At the same time, output per man-hour was upped by almost 10 per cent.

A record such as that established in the industry cannot be possible without the close cooperation of many groups and factors. While production of pulp and paper between 1939 and 1950 was climbing by more than 80 per cent, the number of production workers increased just slightly more than 53 per cent and the number of man-hours approximately 67 per cent.

Production indexes are not measures of the specific contributions of labor or of capital or of any other one factor of production. In pulp and paper, as in other industries, foresight and planning on the part of all those concerned in operation are required to show improvement over past performance. With technological improvements in the industry constantly developing better methods of production, with the skill and effort of workers and management alike maintaining their high standards, and with the state of labor relations ever brightening, pulp and paper manufacture in 1952 can look to a good and healthy year.

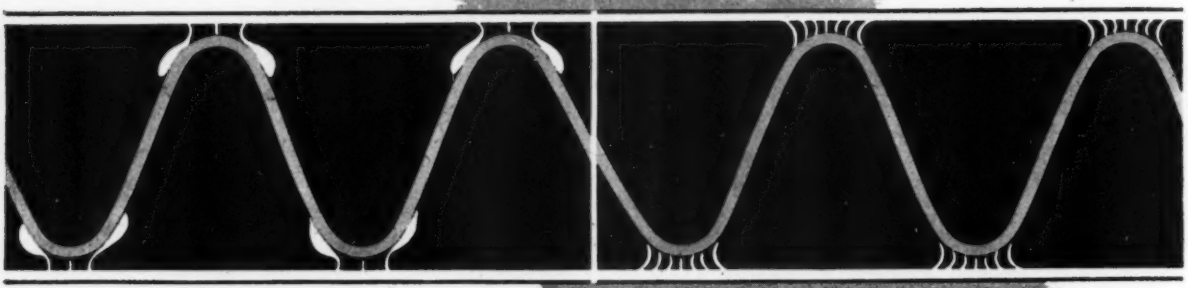
Replenishing the crop

Tree farming during the past several years has demonstrated constant growth both in number of farms and in total acreage. In the month of October 1951 alone, acreage increased by more than 240,000, and indications are that the New Year will bring additional growth to this nation-wide program—one of the newer phases of scientific forest management.

Landowners, large and small, have come to realize that the wealth of the forest must be maintained and used—that the forest must never stand idle, that trees must be harvested when ripe, and that the forest itself must be kept at all times productive. Trees for tomorrow mean jobs for today, tomorrow, and for generations to come.

KELSIZE...

for Uniform Adhesive Application and Moisture Control in Corrugated Paperboard



NOT-this

UNCONTROLLED APPLICATION OF ADHESIVE

1. Excess adhesive.
2. Wasted adhesive serves no purpose.
3. More adhesive used . . . more moisture to remove.
4. Slower machine speeds.
5. Limp board.

this

CONTROLLED ADHESIVE APPLICATION WITH KELSIZE

1. Less waste . . . adhesive savings.
2. Adhesive where you want it . . . where it's needed.
3. Less adhesive used . . . less moisture to remove.
4. Higher machine speeds.
5. Reduced warping . . . stiffer board.

KELCO
REG. U.S. PAT. OFF.
REFINED ALGIN PRODUCTS

Only 15/100 of 1% of Kelsize in starch corrugated adhesive is required to give you these important advantages.

KELSIZE ...a product of KELCO COMPANY

20 N. Wacker Drive
CHICAGO - 6

31 Nassau St.
NEW YORK - 5

530 W. Sixth St.
LOS ANGELES - 14

The Paper Industry Current Comment

Year-end review

As 1951 comes to a close, it is apparent that the year, despite the "police war" in Korea, has been a good one for the paper industry. Volume has been high, consumer demand heavy, and the only cloud is the decrease in earnings due to the heavy war taxes, which have cut down profits in the face of increased volume of dollar sales. Even though there has been a drop in the production of paperboard, the total tonnage for the paper and paperboard industry will reach the astounding total of from 26,000,000 to 27,000,000 tons for the complete year. Pulpwood consumption for the first nine months of the year reached a total of 18,000,000 cords, or an annual record rate of 24,000,000 cords, resulting in a record wood pulp production of an estimated 16,500,000 tons annually.

That all branches of the paper industry have been considerate in their treatment of their customers is shown by a recent order establishing new ceilings for book papers. The new ceilings are, in fact, a roll-back from the earlier ceiling, but the notable feature of this new order is that it establishes new ceilings approximating those of the prevailing prices of the grades affected. In other words, the producers of these papers have not exacted their pound of flesh from their customers, but have adhered in their price scales to the laws of supply and demand. The instance of the book paper order is not mentioned as an exception, but is a concrete proof of industry sentiment that super-controls may not be necessary in all branches of industry, and that the natural law of supply and demand is more potent than any man-made control regulations.

Recognized as essential

A Washington recognition of the essentiality of the paper industry has been evidenced by authorization by the Defense Production Administration of an expansion of newsprint production capacity of 494,000 tons annually. It was specified in official releases that this authorization does not carry any assurance of priorities in construction, and expansion in new construction must wait the conclusion of more urgent defense projects. The approval was granted to allow the granting of certificates of necessity for rapid tax amortization of new newsprint production facilities. The next step will be for the government agencies to grant certificates to any of the five newsprint firms whose applications are pending, if to any. A world deficit in newsprint production in 1952 is estimated by Washington officials to be 600,000 tons, of which 400,000 is centered in Western Europe, where there is little chance of any substantial increase in production.

Paperboard down

Another type of story comes in the paperboard field where production has slackened owing to decrease demand to such an extent that it has had a serious impact on the waste paper market. According to the National Association of Waste Material Dealers, apartment houses, which formerly sold their paper to dealers who received as much as $35 a ton for mixed waste paper, are now being forced to pay money to have the waste carted away and burned. Today's dealers' price for such paper is down to less than $13 per ton, and as much as 100 tons a day is being sent to dumps for burning in the New York area, where the cost of sorting is greater than the selling price of the stock.

During the year when consumer demand has been greater than the domestic supply, foreign producers have reaped a golden harvest. Imports of paper and paperboard in the first ten months of the year totaled a value of nearly $23,000,000, as against slightly over $12,000,000 in the same ten months of 1950. Of this increase, over $4,500,000 was in the paperboard field, chiefly from Canada, but with the drop in domestic demand, the import figures for recent months have not shown the same percentage of increase. The increased imports are due to two factors: first, the domestic demand for all grades of paper and, second, to the price advantage given the foreign producers by the reduction of United States Customs duties through reciprocal trade agreements.

Mobile and RFC

The financial affairs of Congressman Frank W. Boykin of Alabama, who was involved in the still pending investigation of his relationship to the taking over of Mobile Paper Mills, are again in the news. This time the case involves both dealings with the RFC, which was involved in the Mobile Paper Mills affair, and arrests of Alabama bank officials on federal bank law charges. The bank shortage is given as $800,000 and is tied up with a lumbering arrangement between Stutts Lumber Industries of Thomasville, Ala., and Mr. Boykin, who owns large tracts of timber land. The Stutt company had a lumbering contract with Mr. Boykin, and a twelve-month moratorium on payments due the RFC was secured in connection with the release of 20,000 acres of Mr. Boykin's land from the lumbering contract. Mr. Boykin is said to have interceded with the RFC for the securing of this moratorium, and part of the loan of $300,000 from the RFC was used to cover bank overdrafts. The head of the Stutts company was arrested with two officials of the Thomasville bank, but the tangled problem is still pending before the Senate investigating committee.

Financial reports

Paper mill securities at the end of the year showed a marked advance over the values shown a year ago, and during December recovered materially from the slump in previous weeks. Interest in common stock still prevails over that for the preferred issues. During the year there were split-ups in the stock of some of the companies, and in other cases stock dividends were declared.

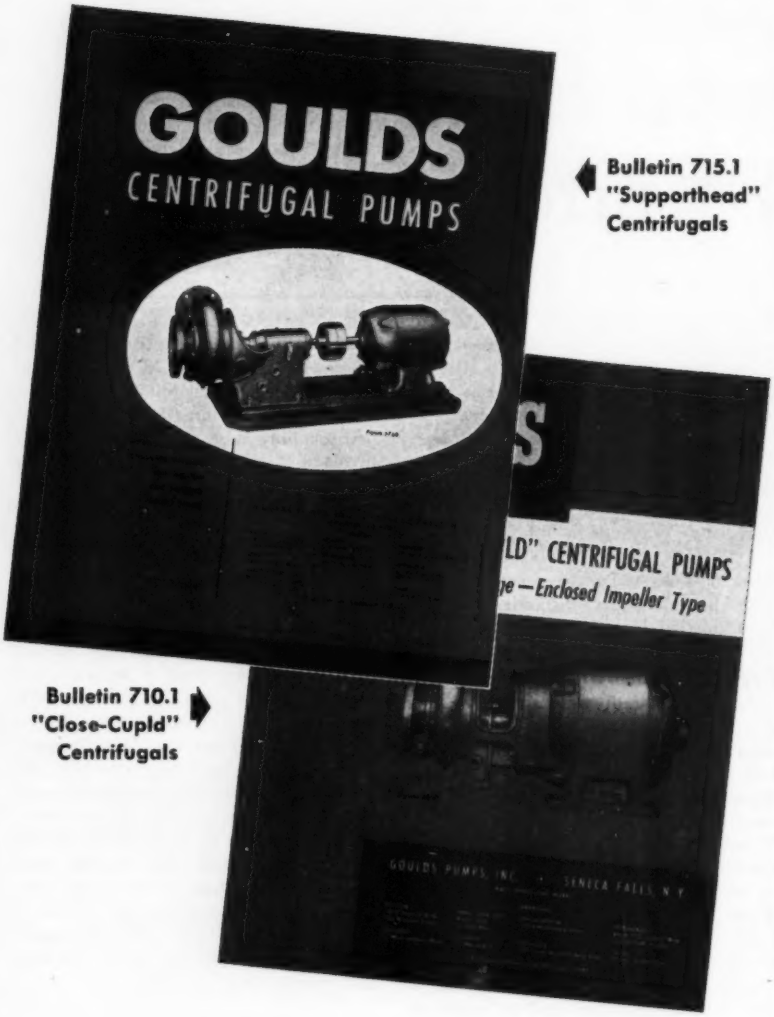
Net incomes

A. P. W. Products Co.—Net income for nine months ended September 30 was $166,975, as compared with $78,374 for the same period in 1950.

Central Paper Co.—Net profit for the third quarter was $170,033, as compared with $70,078 a year ago.

Champion Paper & Fibre Co.—Net income for six months ended September 30 was $4,976,552, as compared with $4,823,114 a year ago.

Crown Zellerbach Corp.—Net income for six months ended October 31 was



These new bulletins make it easier for you to select the right pump

These new bulletins have been designed to help you. New sizes are listed, and, in each bulletin we have put a composite rating chart which includes both "Close-Cupld" and the supporthead. This makes it dead simple to put your finger on the right pump for your requirements.

Another valuable feature of these bulletins is the parts chart. Using this you see exactly what parts are interchangeable for all size pumps and so can keep your spare parts investment to a minimum.

Use the coupon below to send for these useful FREE bulletins *today*. Goulds Pumps, Inc., Seneca Falls, N. Y.

Goulds PUMPS INC. Seneca Falls New York

GOULDS PUMPS, INC.
Dept. PI, Seneca Falls, N. Y.
Send Bulletin 710.1 ☐
Bulletin 715.1 ☐
Name_____
Company_____
Address_____
City_____ Zone___ State____

$11,797,294, as compared with $11,004,285 for the same period a year ago.

Dryden Paper Company, Ltd.—Net profit for the year to September 30 was $1,236,758, as compared with $450,432 a year ago.

Hammermill Paper Co.—Net income for nine months ended September 30 was $1,378,768, as compared with $1,370,081 a year ago.

Hinde & Dauche Paper Co.—Net income for the first nine months of this year was $2,731,988.

Hollingsworth & Whitney Co.—Net income for 39 weeks ended September 30 was $2,502,673, as compared with $1,030,094 for the comparable period a year ago.

International Paper Co.—Net income for nine months ended September 30 was $42,602,321, as compared with $47,692,624 a year ago.

Keyes Fibre Co.—Net profit for nine months ended September 30 was $967,095, as compared with $1,090,931 for the comparable period in 1950.

Kimberly-Clark Corp.—Net income for the fiscal year ended October 31 was $11,852,285, as compared with $12,148,442 for the previous fiscal year.

Lily-Tulip Corp.—Net profit for the first nine months was $2,590,247.

Masonite Corp.—Net income for the year ended August 31 was $3,789,224, as compared with $6,958,413 for the previous fiscal year. (Prolonged strikes had a bearing on the reduced income.)

Mead Corp.—Net income for 40 weeks ended October 7, 1951, and October 1, 1950, was $4,795,359 and $4,325,012, respectively.

Mead Johnson & Co.—Net income for nine months ended September 30 was $1,476,899, as compared with $1,453,673 for the same period in 1950.

Minnesota & Ontario Paper Co.—Net income for the first nine months was $3,962,439.

National Container Corp.—Net income for the nine months ended September 30 was $7,637,000, compared with $3,592,000 last year.

National Paper & Type Co.—Net profit for the year to August 31 was $690,330, as compared with $451,051 in the previous fiscal year.

Nekoosa-Edwards Paper Co.—Net profit for the first nine months was $1,308,015, compared with $1,166,436 for the same period last year.

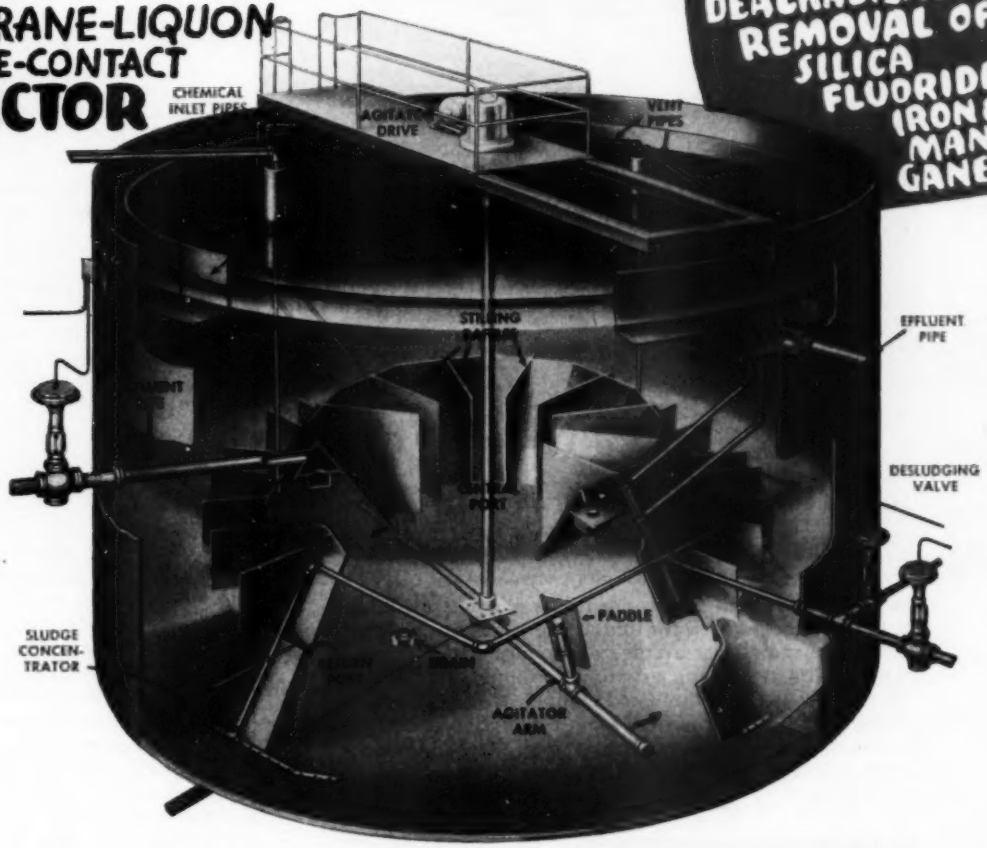
Puget Sound Pulp & Timber Co.—Net income for the first nine months was $2,848,788, compared with $1,686,464 last year.

Rayonier Inc.—Net income for nine months ended September 30 was $8,140,274, as compared with $7,518,478 a year ago.

Riegel Paper Corp.—Net income for 39 weeks ended September 30 was $1,-

Maximum CLARIFICATION with the COCHRANE-LIQUON SLUDGE-CONTACT REACTOR

WATER SOFTENING
DEALKALIZATION
REMOVAL OF SILICA
FLUORIDES
IRON & MANGANESE



EMBODIES ALL 8 BASIC DESIGN REQUIREMENTS of the Sludge Contact Process

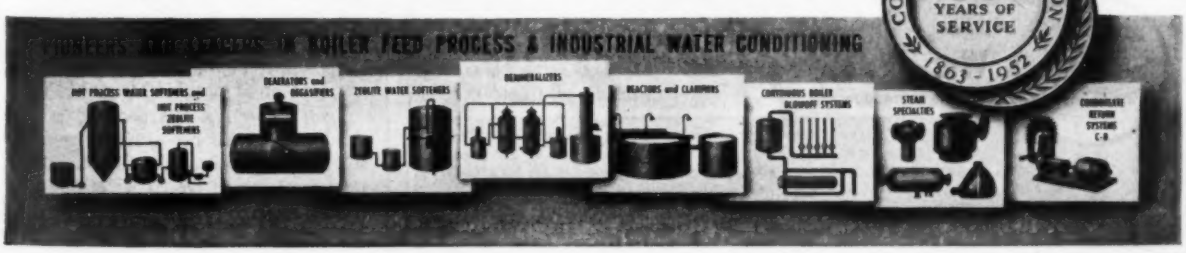
1. Two zones are provided; mixing zone below, clarifying zone above, separated by inclined baffles.
2. Raw water is uniformly distributed into mixing zone. Clarified water is collected evenly by a circular flume at the top periphery (plus radial flumes on larger diameter units).
3. Chemicals are introduced at the point where raw water enters, mixing chemicals, water and slurry simultaneously.
4. Variable speed agitator insures uniform, constantly agitated slurry mixture.
5. Slurry passes from mixing zone through ports in the baffles into the clarifying zone. A large central port plus a small peripheral port avoids conflict of rising water with the returning sludge from the clarifying to the mixing zone.
6. Slurry spreads out across full area of tank above crest of baffles, water rising slowly to separate from sludge.
7. Slurry spills over edge of baffles into sludge concentrator, settling and thickening and being withdrawn at intervals through diaphragm-operated valve.
8. Duration of desludging is controlled by timer. Automatic back-flushing of sludge collector pipe is also provided.

COCHRANE CORPORATION • 3114 N. 17th St. • Philadelphia 32, Pa.

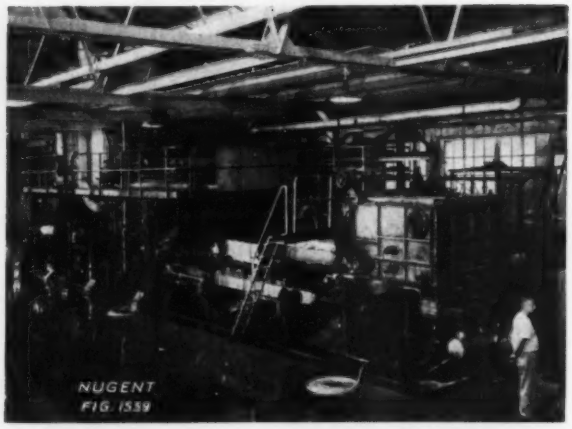
In Canada: Canadian General Electric Co., Ltd., Toronto • In Mexico: Babcock & Wilcox de Mexico, S. A., Mexico City • In Europe: Recuperation Thermique & Epuration, Paris

COCHRANE

89 YEARS OF SERVICE 1863 - 1952

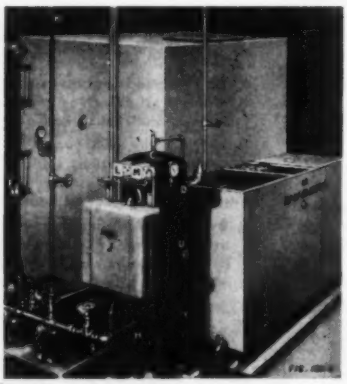

PIONEERS IN BOILER FEED PROCESS & INDUSTRIAL WATER CONDITIONING
HOT PROCESS WATER SOFTENERS and HOT PROCESS ZEOLITE SOFTENERS
DEAERATORS and OXYGASPHERS
ZEOLITE WATER SOFTENERS
DEMINERALIZERS
REACTORS and CLARIFIERS
CONTINUOUS BOILER BLOWOFF SYSTEMS
STEAM SPECIALTIES
CONDENSATE RETURN SYSTEMS C-O

Maintenance Down . . . Savings Up . . .



When you use **NUGENT GRAVITY OIL FILTERS** *for paper machinery*

Nugent Gravity Oil Filters are the economical method of filtering the oil used for lubricating paper machinery. Experience shows that average oil savings are in excess of 95%. And by assuring a continuous supply of CLEAN oil, maintenance is reduced and equipment life extended substantially. For protection against corrosion, Nugent Filters neutralize acidity and maintain a safe value. For economy's sake you can't afford to be without a Nugent Oil Filter.



Nugent Gravity Oil Filters may be operated continuously since each of the multiple filtering units can be removed independently for cleaning. And for further convenience an alarm is given automatically when cleaning is necessary. Write for full details today.

NUGENT TRADE MARK

Wm. W. Nugent & Co., Inc.
435 N. Hermitage Ave. CHICAGO 22, ILLINOIS

Established 1897

OIL FILTERS, OILING AND FILTERING SYSTEMS, TELESCOPIC GAUGES, OILING DEVICES, SIGHT FEED VALVES, FLOW INDICATORS

157,653, as compared with $1,126,199 for the same period in 1950.

Robert Gair Co.—Net income for nine months ended September 30 was $5,014,801, as compared with $3,735,816 for the comparable period last year.

St. Lawrence Corp. Ltd.—Net income for the nine months ended September 30 was $6,025,140, as compared with $4,999,914 a year ago.

St. Regis Paper Co.—Net income for nine months ended September 30 was $12,796,676, as compared with $7,003,924 a year ago.

Dividend delarations

Anglo-Canadian Pulp & Paper Mills Ltd. has declared four quarterly dividends of 50 cents each, making a total of $2 per share payable in 1952.

Carpenter Paper Co. has voted a year-end dividend of 90 cents per share on the common, payable December 21 to stockholders of record December 7.

Eddy Paper Co. has declared a dividend of $5 on the common, payable December 17 to stock of record December 3.

Gaylord Container Corp. has declared a dividend of 37½ cents a share on its common stock, payable December 10 to stockholders of record November 30.

Hammermill Paper Co. has declared an extra of 75 cents and the regular quarterly dividend of 50 cents on the common, both payable December 10 to stock of record November 30.

Howard Smith Paper Mills Ltd. has declared an initial quarterly dividend of 25 cent on the new common, stemming from a 4-to-1 split in September. The dividend is payable January 30 to stock of record December 31.

International Paper Co. has declared the regular quarterly dividends of $1 per share on the cumulative $4 preferred stock and 75 cents per share on the common stock. Both are payable December 17 to holders of record November 23.

National Container Corp. has declared the regular quarterly dividend of 25 cents per share on the common, payable December 10 to stockholders of record November 20; and also the initial dividend of 26.04 cents on the corporation's new $1.25 convertible preferred stock, $25 par value, covering the period from September 25 (date of issuance) to December 10, date of payment for the dividend. Preferred stockholders of record November 20 will receive the dividend.

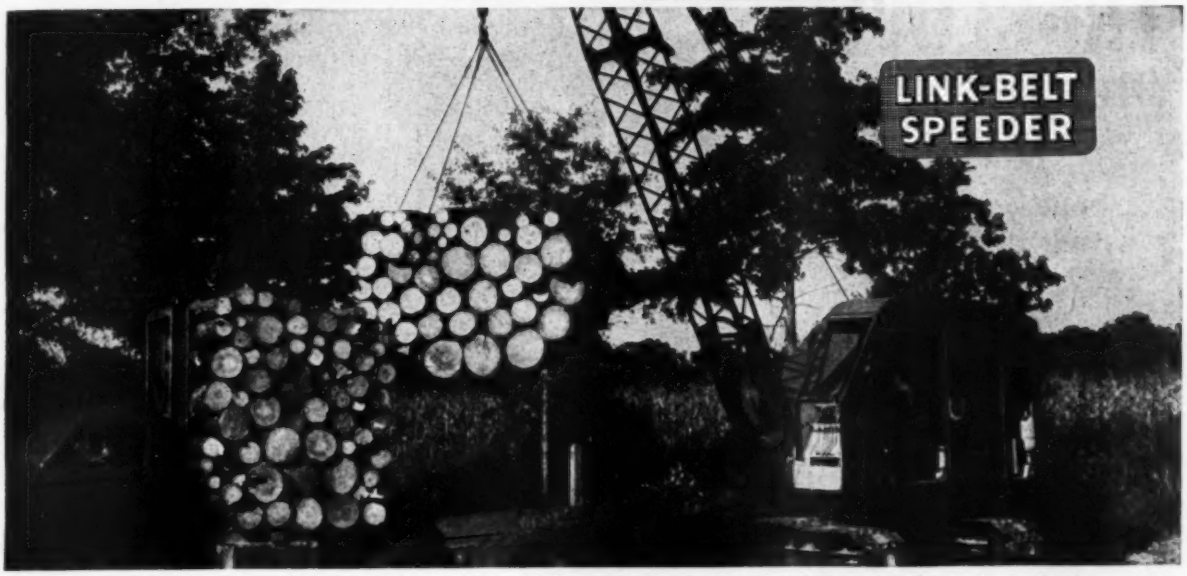
St. Croix Paper Co. has declared a dividend of $1 payable December 15.

Scott Paper Co. has declared a dividend of 60 cents per share of common stock payable December 17 to stockholders of record December 3.

Simplex Paper Corp. has declared the regular dividend of 25 cents per common

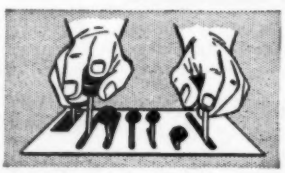
up to 25% more production

LINK-BELT SPEEDER with *Speed-o-Matic* controls



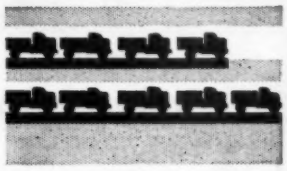
Full hydraulic Speed-o-Matic controls on this Link-Belt Speeder LS-51 give you the perfect "touch" for accurate placement, safety and time saving. Fast and smooth, it's easy on the operator.

Speed-o-Matic full hydraulic controls mean stepped-up production

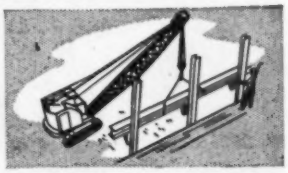


Speed-o-Matic Controls — fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.

Eliminates up to 150 parts — cuts friction, no worn bushings, pins, links or clutch toggles to put you "down."



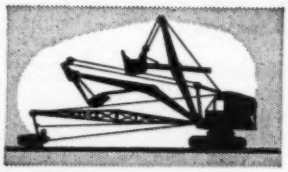
Up to 25% more production — fast operating cycle steps up output and profits. Effortless control keeps operator fatigue down.



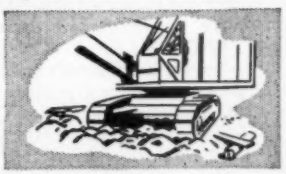
Pinpoint Accuracy — eliminates lost motion. Instant hydraulic response assures spotting heaviest loads—easily, precisely.

Here are other LINK-BELT SPEEDER plus features that work for you

All-Welded Stress-Relieved Construction — extra strength without extra weight. Resists impact, twist. Field service simple.



Convertibility — designed for peak production as shovel, crane, dragline or trench hoe. Convert in field—quickly, easily.



High Ground Clearance — eliminates snagging or fouling in rough areas. No projecting castings or easily damaged parts.

Service — fast, efficient. Link-Belt Speeder Service is nationwide—near you with replacement parts, factory-trained mechanics.

LINK-BELT SPEEDER

CORPORATION

12,882

Builders of the most complete line of shovels, cranes and draglines

CEDAR RAPIDS, IOWA

Only
TRI-CLOVER
OFFERS THE COMPLETE LINE
. . . FOR ALL YOUR
CORROSION RESISTANT
PIPING NEEDS
STAINLESS STEEL Conical End Fittings . . . Recessed End Fittings . . . "Zephyrweld" (Tube O.D. and Schedule V & X IPS Size) welding fittings . . . Stainless Steel Tubing and Pipe . . . Valves . . . Centrifugal Pumps . . . Pre-Fabricated Specialties . . . the complete line from one dependable source — TRI-CLOVER.
Install Tri-Clover's stainless steel or alloy products in your process lines and realize the advantages of increased production and lower maintenance cost. 32 years of specialized experience in solving corrosion piping problems can be yours by consulting our engineers.
Write for details, or see your nearest Jobber.
Tri-Clover
MACHINE CO.
Kenosha, Wisconsin
TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES
FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS
THE Complete LINE

share payable December 22 to stock of record December 14.

Southern Advance Bag & Paper Co. has declared the regular quarterly dividend of 25 cents per share and an extra of 12½ cents, both payable December 19 to holders of record December 3.

Paper mill corporate changes

Kimberly-Clark Corp. has announced that a 90,168 shares of 4½ per cent cumulative stock have been exchanged for a new issue of 4 per cent convertible preferred on a share-for-share basis. The balance of the new stock, amounting to 12,256 shares, has been purchased by Blyth & Co. for public offering at an initial price of $107 plus accrued dividends.

Oxford Paper Co. is offering 80,000 shares of common stock through an underwriting syndicate headed by First Boston Corp. The stock has a par value of $15 and is being offered at $16. The offering constitutes 21½ per cent of Oxford's outstanding stock and is for the account of certain selling stockholders. No stock is being sold by Oxford.

Rayonier, Inc., has arranged a loan of $40,000,000 from Prudential Insurance Co. at an interest rate of 3¾ per cent, with optional provision for repayment of the loan. Of the amount, more than $10,000,000 will be used to pay off older loans, and the balance will provide for contemplated extensive expansion to cover a period of several years.

New York Stock Exchange—Stocks

	Closing Prices Dec. 20, 1951	Nov. 20, 1951	Dec. 20, 1950
A.P.W. Products	* 6¼–6½	* 5⅝–6¼	7
Celotex	18⅜	17⅜	14⅞
Same Preferred	16½	* 16¾–17½	15½
Certain-teed Products	15⅛	16⅛	14
Champion P&F Co.	† 27⅜	25½	47
Same Preferred	* 98–99	* 99–100	106
Chesapeake Corp.	* 34–36	* 32–32½	28¾
Continental Diamond	14⅜	15	12⅛
Container Corp.	36⅛	35⅜	31⅜
Same Preferred	* 96½–98½	96½	103⅝
Crown Zellerbach	54	49	45⅝
Same Preferred	99⅝	97⅝	103⅝
Dixie Vortex	† 37½	* 68–70	44⅝
Eastern Corp.	26⅝	24¼	19½
Robert Gair	18¼	17¼	12¾
Same Preferred	* 18¼–19¼	* 19¼–19½	18
Gaylord Container	29	29⅞	23⅞
International Paper	49⅜	46	50⅛
Same Preferred	98¼	* 98¼–99	107
Kimberly-Clark	46⅝	44	46
McAndrews & Forbes	* 42½–43½	42½	40
Marathon	56	56⅜	34¼
Masonite	† 35	37	60
Mead Corp.	25¼	24¼	22⅝
Same Preferred	* 93¼–94	93	93½
National Container	12⅝	13⅜	11
Rayonier, Inc.	62	58¼	49
Same Preferred	34⅝	35	35¼
Scott Paper	51⅛	48	44
Same $3.40 Pref.	* 88–90	89	98
Same $4.00 Pref.	*101¼–103½	101	106
St. Regis	17⅝	16⅞	13⅝
Same Preferred	91½	* 92–94	93
Sutherland Paper	24	22½	43
Same Preferred	*103–105	107¼	113
Union Bag & Paper	48⅝	45½	37¾
United Board & Ctn.	* 17–17¼	17⅛	17
United Wall Paper	3	3	2⅜
Same Preferred	* 25–28	* 24¾–25	22¼
U. S. Gypsum	106½	111½	99½
Same Preferred	*165–168	*171½–174	184
West Va. P. & P. Co.	83½	83⅜	72½
Same Preferred	*106–107	105½	109

New York Stock Exchange—Bonds

Celotex 3½%	101	.....	102
Champion P&F Co. 3%	102	.....	104
Mead Corp. 3%	97½	.....	107

New York Curb Exchange—Stocks

Am. Writing	11⅜	12¼	8½
Great Northern	54	55½	44½
Hammermill	36	35	.....

* Closing Bid and Asked Prices.
† New.

From trees, from scrap paper, from rags come the indispensable paper and board products on which this country and the world depend so heavily. To conserve these resources . . . to produce the greatest amount of finished product from these raw materials is the job of paper machinery.

And the job of Downingtown Manufacturing Company is to develop, through research and engineering, paper machinery which will conserve raw materials. And not only raw materials but conserve also, valuable horsepower, steam and production and maintenance labor as well.

Modernization of your paper machinery *is* conservation. Downingtown is ready to build new machines or replace obsolete paper making equipment from stock preparation to final slitting and winding. Consult your Downingtown Sales Engineer.

DOWNINGTOWN MANUFACTURING COMPANY, Downingtown, Pa.

Pacific Coast Representative:
John V. Roslund, Pacific Building, Portland 4, Oregon

Downingtown Fibrepulper, Manufactured in Canada by
Waterous, Limited, Brantford, Ontario

DOWNINGTOWN

DESIGNERS AND BUILDERS OF
PAPER, BOARD AND FELT MACHINES SINCE 1880

HIGHEST EFFECTIVE INCH CUT POTENTIAL

Another exclusive feature of the Controlled Flow VICTORY BEATER* makes possible "tailored" fibre treatment!

*Patents issued and pending.

Paper makers know too well the many variable factors which determine the inch cut potential of fibre treating equipment. Control of these factors to maintain an *effective* high inch cut performance is an important achievement of Noble & Wood engineers who pioneered the revolutionary VICTORY BEATER.

The *Controlled Flow* VICTORY BEATER is engineered to make its high inch cut potential a predictable, *effective* fibre development factor. *It is this superior engineering that makes the VICTORY BEATER completely outstanding in high quality, high tonnage, continuous production!*

VICTORY BEATERS are made in two styles: (a) **Single Roll** units for handling batches as small as 500 pounds. (b) **Multi-Roll** units with two, three or more rolls for treating 100, 150, 200 or more tons per day on a continuous production basis. All the facts and figures are available for your examination, so write, wire or phone *today* for complete information. Ask for Booklet PI 152.

1. *Controlled Flow — uniform, positive fibrillation*
2. *Pressurized bedplates*
3. *Absolute control up to 40 tons bedplate pressures*
4. *Centralized bedplates assure 100% roll-bedplate contact*
5. *Highest effective inch cut potential*
6. *Horizontal roll oscillation makes bars self-honing*
7. *Lowest maintenance cost*
8. *Tailored-to-your-plant, low-cost installation*
9. *Spherical anti-friction roller bearings*
10. *1000 gallons per minute capacity*
11. *Highest quality, high tonnage production*
12. *All-time record for continuous production!"*

THE NOBLE & WOOD MACHINE CO.

Paper Mill Machinery

HOOSICK FALLS • NEW YORK • U.S.A.

Mid-West: Ronningen Engineering Sales • Vicksburg, Mich. West-Coast: Dan E. Charles Agency • 706 Jones Bldg. • Seattle 1, Wash.

Canada to Receive Sulphur on Same Basis as U. S. Industry

The Defense Production Administration announced in Washington, D.C., recently that 86,250 tons of sulphur have been allocated to Canadian civilian and defense production for the first quarter of 1952. This is at an annual rate of 345,000 tons. It was explained that the 345,000-ton rate includes 335,000 tons of U.S. sulphur, representing the actual Canadian use of the mineral during the base year 1950, plus 10,000 tons representing the sulphur needed for new defense production.

It was pointed out that DPA has agreed to supply Canada with the same proportionate quantity of sulphur, based on 1950 consumption, that U.S. domestic consumers receive from the available supply. DPA-NPA agreed to permit a carry-over into the second quarter of any balance of the 86,250-ton first quarter allotment not delivered before April 1.

Canadian officials have reported that conservation efforts by Canadian industrial users of sulphur (including pulp and paper manufacturers) have resulted in a lower-than-anticipated usage during 1951, with a consequent better-than-average inventory than had been expected. It is predicted that new conservation techniques will make possible further savings in 1952.

However, Canadian industrial officials have informed DPA that even with the best possible conservation, new supplies of sulphur during the first half of 1952 will be insufficient to meet Canada's needs for capacity production of newsprint and pulp. If capacity production is to be maintained, a further equalization of mill inventories and an extra drain on these inventories will be inescapable.

Canadian Official Comments on Action

According to R. M. Fowler, director of the pulp and paper division of Canada's Department of Defense Production, careful study was given to the level of U.S. sulphur exports to Canada during the first six months of 1952 and to requirements of Canadian defense industries and pulp and paper mills. "Much of Canada's defense is closely related to the defense program of the U.S., and a major part of U.S. requirements of newsprint and chemical pulp comes from Canada," he said. The most critical period for sulphur supplies appears to be 1952, particularly the first six months.

During the second half of the year it is expected that some auxiliary sulphur supplies from pyrite roasters, sour gas wells, and smelter gases will begin to appear.

World Shortage Continues

The International Materials Conference in Washington has recently completed a survey of the global sulphur shortage. The deficit for free world nations is expected to be about the same in 1952 as in 1951—some 1,300,000 long tons. Output in 1951 will be about 5,860,000 tons; in 1952, 6,300,000. Needs will rise from 7,100,000 tons to 7,600,000 tons.

As the prime producer of sulphur, U.S. industry has been heartened by the fact that many nations are switching to pyrites in making sulphuric acid. For the first time in a generation, more of the world's sulphuric acid will come from pyrites than from sulphur in 1952. Despite this favorable sign, U.S. chemical producers and processors are prepared for further cuts. As a result, industrialists are planning strict conservation and protection of their interests when supplies are allocated.

1952 Production Estimated at 5,000,000 Tons

Members of the Native Sulphur Industry Advisory Committee, meeting recently with NPA officials, estimated that the industry's production for 1952 would not exceed 5,000,000 long tons. NPA announced that the current annual rate of production, based on the first 10 months of 1951, is 5,311,438 tons.

Spokesmen for the native sulphur industry stated that the present annual rate of production could not be taken as a reliable estimate of possible 1952 production, and particularly as an estimate for the first half of this year. They pointed out that current inventories are considerably below those of 1950, and that the output from a number of mining properties is declining and probably will continue to decline. It was further emphasized that some new production, which is currently being developed, will not begin to affect the supply situation until the last half of 1952.

Mexico Completes Canadian Shipments

During December, Mexico planned to export 2,500 tons of sulphur to Canada, according to an announcement from the Bureau of Prices. This was to complete the 5,000-ton export to Canada promised for 1951 in exchange for an increased quota of Canadian newsprint.

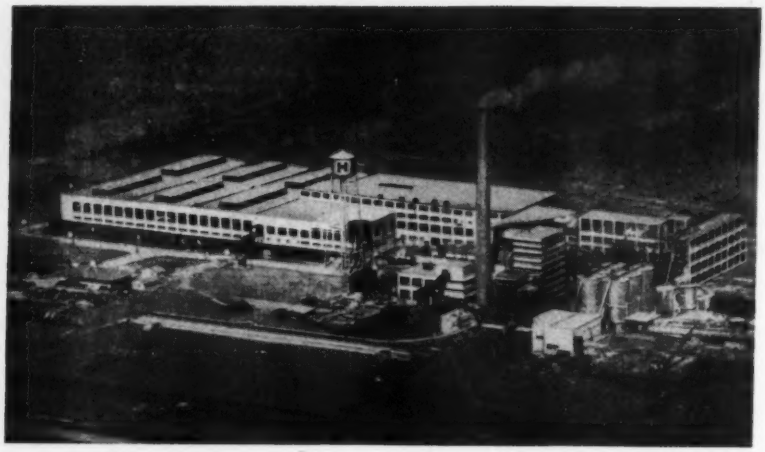
Sulphur production in Mexico is increasing steadily, due to a new "gas washing" process installed in a Poza Rica plant. According to a Petroleos Mexicanos spokesman, the new plant is expected to be producing 140 tons per day in the near future, with the total capacity of 200 tons daily when new equipment has been installed. The production from the Poza Rica plant will adequately supply Mexican needs, thus remedying the shortages of past years. When a sufficient backlog has been reached, the government may be disposed to consider exports to foreign markets, but not at the expense of domestic industry.

Ceylon in Market for Crude Sulphur

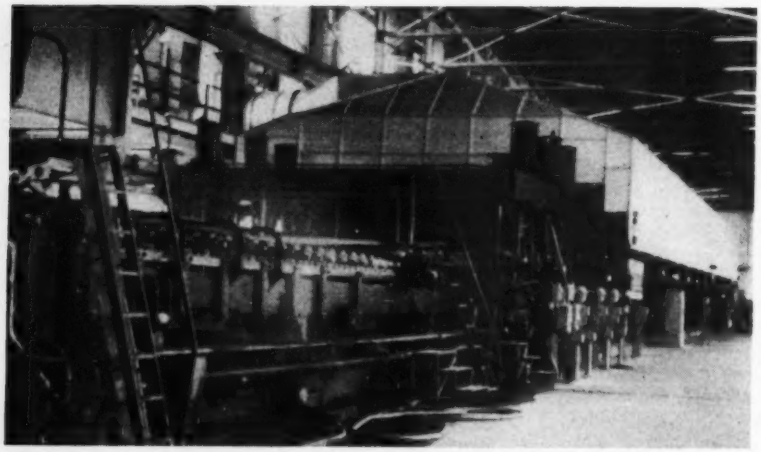
Quotations have been invited for the government of Ceylon for the supply and delivery of 500 long tons of crude sulphur suitable for the manufacture of paper and required by the government paper factory at Valaichenai. It is required that the successful bidder complete delivery of the full quantity within six months of the date of acceptance of his bid.

NEWS HIGHLIGHTS

Sulphur Developments....1147
Mill Expansion Plans....1148
Wastepaper Purchases High....1154
Newsprint Outlook....1156
Canadian Developments....1157
Stream Pollution Research....1162
Industry Notes....1168
Production Report....1174



AERIAL VIEW of Hudson Pulp & Paper Corp's. kraft mill at Palatka taken shortly before dedication of the second $10,000,000 unit



ELECTRICALLY CONTROLLED and dynamically balanced to operate at a rated speed of 2,000 feet per minute, this paper machine was recently installed at Hudson's Palatka plant

Hudson Opens $10 Million Florida Plant... as Mill Expansions, Mergers Continue

The second unit of Hudson Pulp & Paper Corp's. kraft mill in Palatka, Fla., was dedicated December 6 in ceremonies featuring Gov. Fuller Warren. The $10,000,000 addition doubles the plant's capacity and permits broad flexibility in output.

Bringing Hudson's total capital investment in the Florida city to more than $22,000,000, the new plant boosts daily production to 400 tons of finished, unbleached kraft, about 85 per cent of which is to be converted to kraft wrapping, butchers paper, gummed sealing tape, grocery bags and sacks, and multi-walled bags for industrial products. The converting operations are to be carried out in the fully integrated plant. The firm entered the multi-walled bag field about a year ago and with the new facilities is now equipped to turn out nearly 15,000,000 bags per month.

According to William Mazer, executive vice president, the new facilities incorporate virtually every modern improvement in mechanical equipment and enable the firm to produce kraft paper in every weight from 20 to 90 pounds. The expansion provides employment for 600 additional people.

New Equipment Described

Chief feature of the new mill is the 234-inch Pusey & Jones paper machine, capable of producing both machine-finished and machine-glazed papers and electronically controlled and dynamically balanced to operate at a rated speed of 2,000 feet per minute. The Fourdrinier is of the latest design and has a wire drive roll in addition to the couch roll. Between the first and second dryer sections is located a smoothing press; and between the second and third sections of dryers is located a Yankee dryer 12 feet in diameter.

Other facilities and equipment include a new water treating plant with a capacity of 12,000,000 gallons per day; doubled wood yard and wood room facilities; five new 10-ton digesters, with a separate gassing-off system for turpentine recovery; three new counter-current brown stock washers and deknotters, and all other equipment necessary to the doubling of the pulping capacity.

The stock preparation room, laid out for both continuous and batch-colored stock systems, has chests so arranged as to facilitate speedy change-overs with a minimum of lost production time. The power plant has been doubled by the addition of one oil-fired boiler and one refuse boiler, the latter equipped with a bark burning furnace. A 7,500-kilowatt turbine brings total power capacity to 15,000 kilowatts.

A new sextuple-effect evaporator unit supplements the existing unit. The recovery boiler is to be a 250-ton unit equipped with a Cascade evaporator. There is a precipitator for recovering the dust from the gasses from the recovery unit.

The existing causticizing plant is being expanded to provide the additional white liquor required. New equipment includes a slaker, causticizing tanks, green liquor clarifier and green liquor dregs washer, lime kiln, and lime mud vacuum filter. Additional new and reburnt lime storage tanks with lime handling systems are also included.

Latest Type Paper Machine Installed

Stock will be regulated to the Pusey-Jones special fourdrinier MF and MG kraft machine through a metering stuff box from which the stock will go to a 20,000 gpm fan pump driven by a synchronous motor with an electric coupling for providing speed variations. There is to be a pickup transfer felt and suction roll. The press section consists of a transfer press and a three-roll dual cloverleaf press. The drying section consists of a creping dryer and three sections of main dryers, with a total of thirty-three 60-inch diameter paper dryers and 14 felt dryers, including 10 Feeney dryers.

One eight-roll calender stack, Pope reel and a high-speed winder will be provided at the finishing end. The machine will be driven by an electric sectional drive, and it is equipped with the usual auxiliaries, including the oiling and condensate systems and vacuum pumps. A new type of tile-lined wire and wet broke pit was designed especially for the machine.

There is to be a conventional broke beater at the dry end, supplemented by a broke pulper located in the stock preparation room. All water from the wet broke and wire pit will be pumped to vacuum save-all for the recovery of fibres in the white water.

Ceremonies Mark Opening

Preceding the dedication by Governor Warren, a two-hour program of entertainment was presented by Hudson employees. Later, employees and their families were taken on escorted tours through the plant.

In the evening the company was host at a dinner attended by business, industrial, and social leaders of the community. Principal speakers included Vice President Mazer, who described Hudson's growth through the years since 1896; Theodore Mittendorf, vice president in charge of sales, and McGregor Smith, president of Florida Power & Light Co. and head of the Florida Industrial Development Council.

Kimberly-Clark Acquires Munising Paper Co.

Kimberly-Clark Corp., Neenah, Wis., has completed negotiations for a controlling interest in Munising Paper Co., Munising, Mich., at $19.50 a share. K-C is making a similar offer for the remaining stock. The newly acquired property involves approximately 75 acres of land and includes a pulp mill, paper mill and a power plant. Total floor space is 333,000 square feet.

Munising operations are in the specialty paper field. In addition to making its own and some market pulp, it manufactures fine printing paper—bonds, mimeographs, and ledgers—and specialty papers. Net sales this year are expected to approximate $9,000,000 and are divided among a fine paper division, a household products division, and a treated paper division. Employment at the plant exceeds 550. Executive and sales offices are in Chicago. Other than directors, Kimberly-Clark expects to retain the same management, including B. L. Trillich as president.

Olin Industries Plans Asquisition of Frost Lumber

Agreement on a plan of consolidation has been announced jointly by Olin Industries, Inc., East Alton, Ill., and Frost Lumber Industries, Inc., of Shreveport, La. Frost owns timberlands, sawmills, railroads, and oil and gas properties in Louisiana, Arkansas, and Texas. Olin, manufacturer of arms, ammunition, industrial explosives, cellophane and other products, plans to operate Frost as a division, retaining the present management.

The acquisition would provide Olin with 450,000 acres of heavily forested land, more than sufficient to support on a perpetual yield basis the nitrating and dissolving wood pulp mill that Olin plans to construct. This in turn would contribute to government requirements and provide raw material for Olin's future expansion in the cellophane industry.

Frost Lumber stockholders were to vote on the merger December 17. The proposed 3-for-1 split of Olin common was to be submitted to Olin stockholders December 20. Upon consummation of the plan for consolidation, Frost is to distribute to its stockholders 16½ shares of new Olin Industries common, following the 3-for-1 split, for each of the 59,424 shares of Frost stock in the hands of the public.

Bemiss-Jason Absorbs Two Box Firms

Officers of Bemiss-Jason Corp. have announced the acquisition of two San Francisco set-up paper box firms. Involved in the merger are Raisin-Thiebaut, Inc., and Custom Paper Products, the latter of which was founded last year by the late Wilson J. Field, together with R. P. Bemiss and W. E. Jason.

Both Raisin-Thiebaut and Custom will continue to operate under their present names as independent divisions of Bemiss-Jason. Present personnel are to be retained. Box manufacturing equipment, however, will be integrated for increased production at Bemiss-Jason's San Francisco headquarters. B-J will maintain sales offices and a factory for its box divisions in San Francisco after completion of new general offices and main paper converting plant at Redwood City, Cal., early this year.

International Opens Southern Paper Container Plant

International Paper Co. has opened a $1,000,000 plant at Atlanta, Ga., for the manufacture of paper milk containers. Operated by the single service division of International's Southern Kraft Division, the new plant comprises 55,500 square feet of floor space and will produce about 30,000,000 milk containers per month. Seventy-five employees have been hired, but the firm expects to double this number within a year. Production is to be allocated to customers in the Carolinas, Georgia, Florida, Tennessee, and Alabama.

Simpson Logging Co. Buys Everett Pulp & Paper

Pending purchase of the 60-year-old Everett Pulp & Paper Co., Everett, Wash., by Simpson Logging Co. was announced recently. The transaction, uniting two of the oldest forest products firms in the Pacific Northwest, involves no change in name, active management, policies or plant locations.

Announcement of the pending acquisition was made jointly by William G. Reed, Seattle, Simpson board chairman, and Warren H. Jenkins, president of Everett Trust and Savings Co., who represented stockholders of the paper company.

Everett Pulp & Paper, founded in 1891, is the largest producer of fine, bonded papers in the West. Its acquisition brings to Simpson a further integration of operations, which now include production of sawmill lumber, plywood, doors, and wood fibre insulation board. The amount involved in the transaction was not disclosed.

The paper plant has an output in excess of 80 tons daily. Its products include an extensive line of fine paper and stationery specialties. The firm was organized and built by eastern financiers, including the Rockefeller interests. Improvements costing an estimated $3,000,000 are in progress at the present time, and, according to reports of the transaction, will be brought to completion by the new owners.

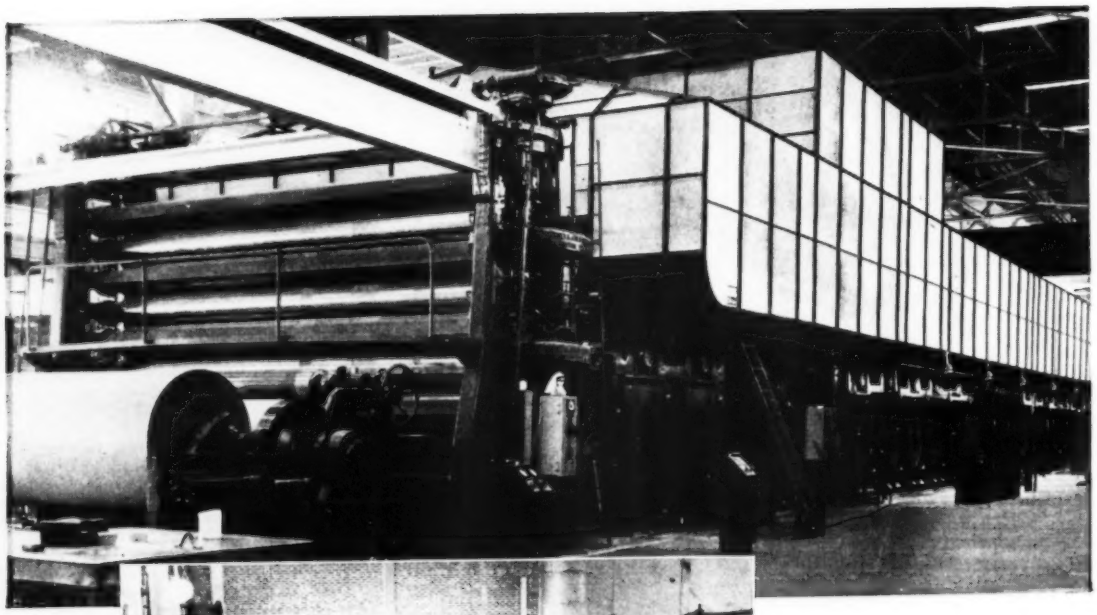
A. B. Moody, who has been with Everett in executive positions since 1927, is to be general manager under the new ownership.

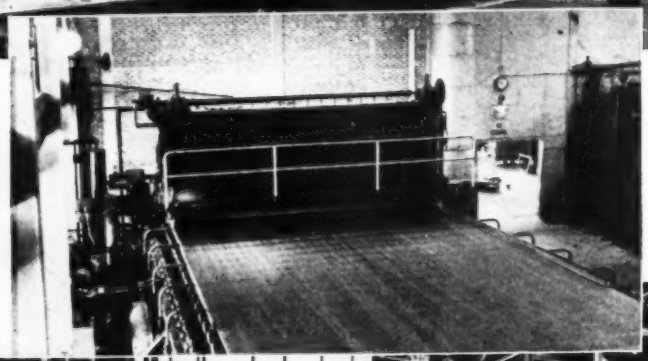
Marathon Corp.,
Rothschild, Wis., has ordered a $1,000,000 lakes steamer designed to carry finished pulp from the firm's Port Arthur, Ont., mill to the Oswego docks. The ship is under construction at the Canadian Shipbuilding and Engineering Co. yards in Kingston, Ont. The vessel is 260 feet in length and has a 44-foot beam. It will transport about 2,800 tons at speeds up to 10 miles per hour. The ship draws 14 feet of water when fully loaded and is propelled by diesel engines.

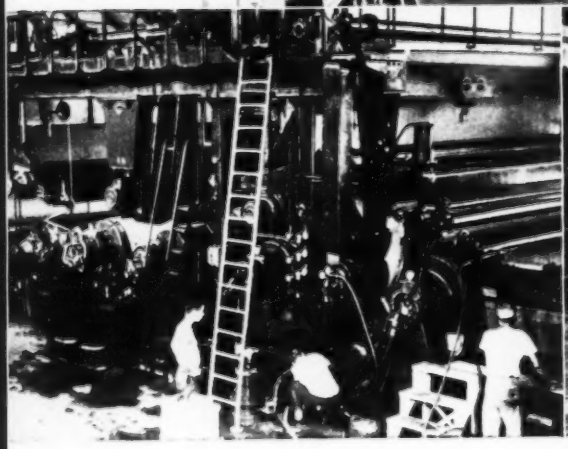
Statler Tissue Corp.,
Boston, has purchased the properties of the Golden Fleece Paper Mill, manufacturer of Golden Fleece Tissues, Bancroft, Mass.

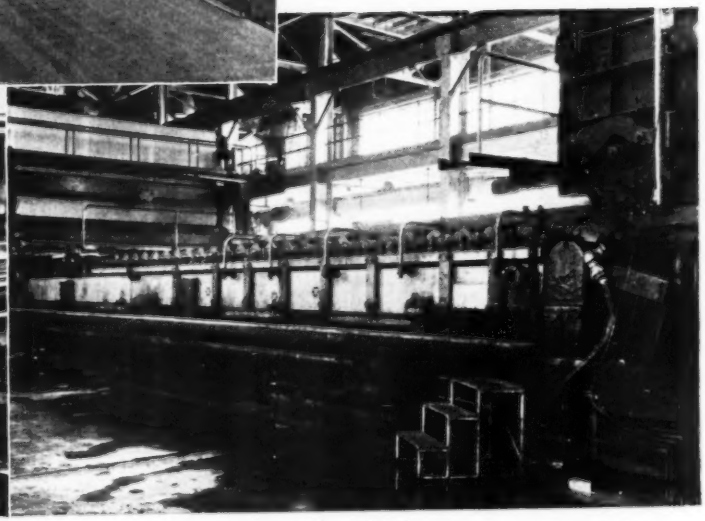
Minnesota & Ontario Paper Co.,
International Falls, Minn., began production of bleached groundwood pulp during the last week of November. The bleaching process was developed by Du Pont. For the first time in Mando's history, 100 per cent bleached pulp was

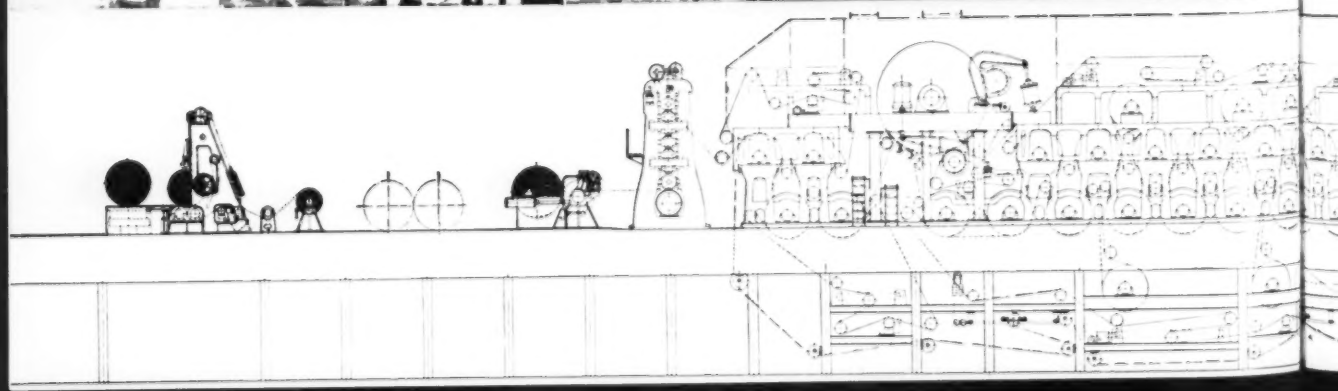
Another











great machine for

HUDSON

The largest machine of its kind for the manufacture of light-weight kraft bag and wrapping papers started operation October 25, 1951.

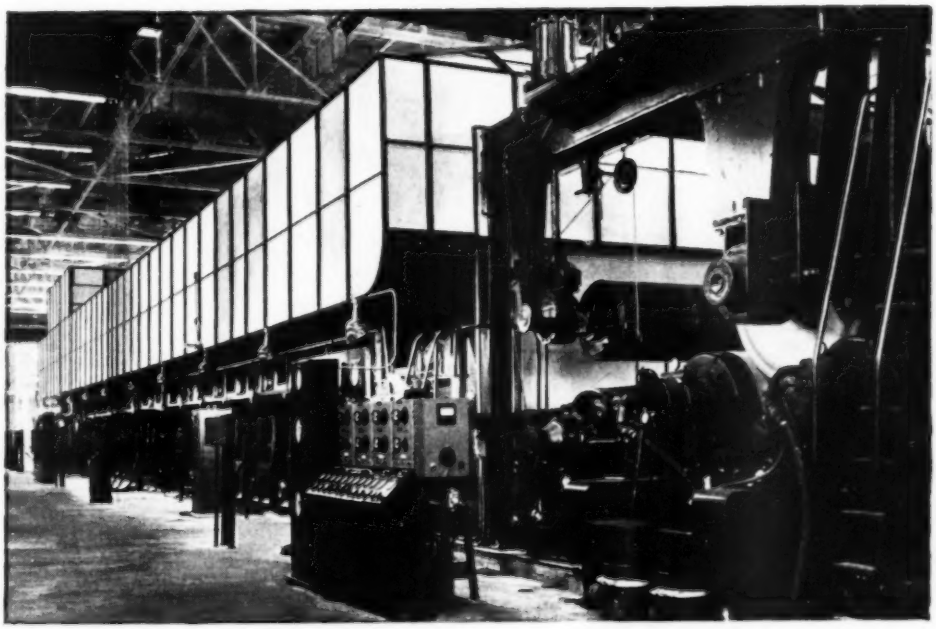
It's the No. 2 machine for the Southern Division, Palatka, Florida mill of Hudson Pulp and Paper Corporation . . . a high-speed Puseyjones Fourdrinier that has taken its place next to the No. 1 machine built by Puseyjones in 1948.

It's a 2-purpose machine – for M.F. or M.G. paper. It's the first machine of this type where the new vacuum pick-up and transfer arrangement is employed.

Special dryer arrangement includes a 12 ft. diameter Yankee Dryer followed by a small section of dryers to facilitate operation when by-passing the Yankee Dryer.

Whether you are interested in a complete new high-speed papermaking machine or in rebuilding your present machines for better profit, it will pay you to talk to a Puseyjones engineer now. Write or call us today.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Fabricators and Welders of all classes of Steel and Alloy Products
Wilmington 99, Delaware, U.S.A.



FEATURES OF 236" "PUSEY-JONES" FOURDRINIER MF AND MG KRAFT MACHINE AT HUDSON PULP & PAPER

Designed for top speed of 2,000 feet per minute. Air pressure type headbox and slice.

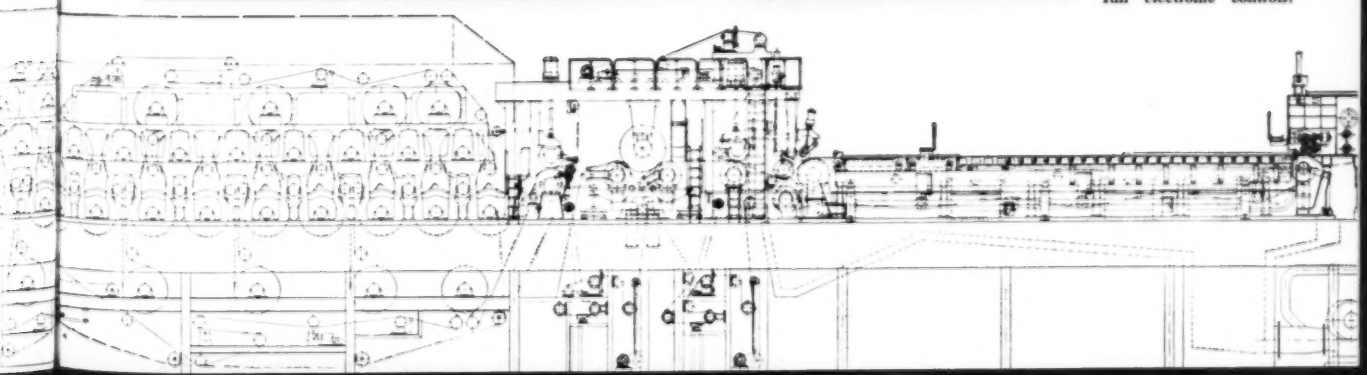
Fourdrinier Part suitable for wire 236" wide, 125' long, equipped with breast roll 34" diameter, table rolls 12½" diameter, suction couch 42" diameter, and auxiliary drive couch roll 34" diameter. Wire changing is accomplished with "Rapi-drape" device, including Hydra-motor unit for raising and lowering the breast roll.

Press Part includes four suction rolls–26" pick-up roll, 36" transfer roll, and two 36" main press rolls, the latter in dual combination with a 60" center roll of so-called cloverleaf arrangement.

Dry Part consists of 35 paper and 14 felt dryers, all 60" diameter. A 42" receiving dryer is arranged for creping. A smoothing press, which also may be used for striping, is located between the first and second dryer sections. The 12' Yankee dryer unit is also equipped with a special striping roll and follows the second dryer section. To simplify the handling of the sheet and minimize breaks when by-passing the Yankee dryer running on M.F. grade, a third section of four 60" paper dryers is located between the Yankee dryer and the single stack of calenders.

Other new features include air-controlled tension on the fourdrinier wire, improved vacuum connections to the flat boxes, and quick handling device for removing and replacing individual suction boxes. Air loading has been incorporated in the calender stack and the reel redesigned to prevent vibration and jumping, to the end that "bull's eye" rolls are produced.

8-roll Calender stack, Pope reel, and a high speed Winder with special roll handling device are provided at the finishing end. The machine is driven by G.E. electric sectional drive with individual section generators and full electronic controls.



Appleton FELTS

for **DESIGN** *and*
FINISH-SERVICE-
DEPENDABILITY
and
UNIFORMITY

APPLETON
WOOLEN MILLS
APPLETON, WIS.

used in the manufacture of paper on all three machines at International Falls. The groundwood bleachery is part of the firm's six-year modernization program, on which $17,000,000 has been spent so far. The bleachery can treat 75 tons of pulp per day. The process uses either a combination of sodium and hydrogen peroxide or sodium peroxide and hydrogen peroxide separately.

Southern Kraft Timberland Corp.,
a subsidiary of International Paper Co. operating in Georgia, recently gained title to the Henry Ford estate at Richmond Hill, Ga., from the Ford Foundation. The estate, consisting of approximately 50,000 acres of forest land, is to be operated as a pulp-producing forest. The area is also to be used as a demonstration forest for wood farmers in the area, with a conservation forester in charge of operations.

Monadnock Paper Mills,
Bennington, N.H., has announced that approval of a $20,000,000 bond issue by the residents of Elizabethton, Tenn. will not affect the firm's New Hampshire operations. Monadnock plans construction of a mill at Elizabethton, financed by the bond issue and rented to the operating firm at a reported $1,400,000 per year.

Central Paper Co.,
Muskegon, Mich., has announced acquisition of all outstanding stock in Mantane Contracting Ltd., a pulpwood producing firm at Thessalon, Ont. The action is part of Central's expansion plans whereby it is acquiring and developing supply sources of raw materials.

Brown Paper Co.,
Berlin, N.H., plans to begin construction of a completely modern pulp pilot plant. The small-scale mill will process pulp experimentally and commercially from wood to bales. The plant will enable Brown to extend its studies to the various advanced techniques of preparing pulps.

Bowater Paper Corp. Ltd.
has purchased 579 acres of timberland as a partial source of supply for a $50,000,000 newsprint mill it proposes to build near Cleveland, Tenn. This is the first outright purchase by Bowater, following application to the National Production Authority for a certificate of necessity to build the mill. The tracts, purchased for a total of $14,660, are situated in Murray County, Ga.

National Container Corp.
is leasing a $1,250,000 factory building being erected in Milwaukee by Cream City Construction Corp. The 160,000-square-foot structure is scheduled for completion in May and will be used by National for manufacturing corrugated shipping containers. Employment is expected to be about 100.

West Tacoma Newsprint Co.,
Tacoma, Wash., has announced plans for boosting its production by 36,000 tons annually. The firm is spending $5,000,000 for a second machine at its Tacoma mill. The new unit is expected to be in operation by the first quarter of 1953.

General Box Co.,
Chicago, was to move its executive headquarters during December to a modern building in Des Plaines, a suburb. The new offices and laboratories were planned to provide adequate testing and design research operations. No manufacturing will be done at the site.

Nekoosa-Edwards Paper Co.,
Port Edwards, Wis., has recently completed a new warehouse designed for expediting the flow of finished paper for speedier shipping. The building contains 52,000 square feet of floor space and will accommodate up to 3,500 tons of paper stock. The truck loading platform is 15 feet wide, 100 feet long, and is entirely enclosed.

Potlatch Forests, Inc.,
Lewiston, Idaho, expects to start soon on an expansion program that will double the output of its pulp and paper mill. The plant's present capacity is rated at 150 tons of kraft paper daily.

Carpenter Paper Co.,
Omaha, Neb., has purchased all the outstanding stock of Swigart Paper Co., Chicago. Announcement of the sale was made by the First National Bank of Chicago, trustee and attorney for the owners of Swigart, one of the leading paper distributing companies of the Midwest.

Constantine Board & Paper Co
expects to operate its mill at Constantine, Mich., beginning this month. The mill has been under lease to American Can Co. for several years. The mill will continue to make container, chip, news and lined boards on its 96-inch trim, four-cylinder machine. Production is to be sold in the open market.

Rhinelander Paper Co.,
Rhinelander, Wis., has announced that its new No. 8 machine turned out its first paper November 21. This climaxes an expansion program costing an estimated $3,000,000 over the past 18 months. The new machine adds 6,000 tons of paper a year to the present annual output of 45,000. Cost of the new machine and the building in which it is housed was $1,750,000. The machine is 229 feet in length, produces a sheet 120 inches in width, and operates at a speed of 750 feet per minute to deliver a maximum of 18 tons daily. In addition, Rhinelander constructed a new turbine room and installed a high voltage electrical distribution system.

Steiner Co., Inc.,
Utica, N.Y., recently filed a certificate of incorporation in the amount of $100,000 in capital stock. The new firm is to manufacture a variety of paper products, including paper towels, toilet tissue, facial tissue, paper napkins, and paper tablecloths. Directors chosen to serve until the first meeting of stockholders are Frank G., George R., Lawrence M. and Richard R. Steiner, all of New York, N.Y., and Paul Soheim of Utica.

Certificates of Necessity

Figures released recently by DPA show that 82 certificates of necessity were granted manufacturers of paper and allied products through October 19, 1951. The list excludes the applications approved during the 60-day moratorium from August 19 to October 19, when no dollar amount was certified.

The 82 certificates represented investments totalling $511,916,000, with the tax amortization allowed being $269,488,000, or 52.6 per cent of proposed investment.

At the same time, seven certificates were granted sulphur manufacturers. The proposed investment in this field was $8,259,000, with $6,651,000 being allowed for tax amortization. Tax benefits allowed represented 80.5 per cent of proposed investment.

West Va. Pulp & Paper Co.
has been granted certificates of necessity for kraft paper expansion at Covington, Va., and North Charleston, S.C. Tax amortization allowed in each case amounted to 55 per cent.

Pulpwood Ceilings for Eastern States Set

OPS has announced new dollar-and-cent ceiling prices for pulpwood produced in Pennsylvania and in 10 southern New York State counties. The order stabilizes prices at about the same levels prevailing between January 25 and February 24, 1951.

New York counties involved are Chatagua, Cattaraugus, Allegheny, Steuben, Tioga, Sullivan, Orange, and Rockland. Ceilings per cord, f.o.b. car or delivered to mill by truck up to 25 miles, are: peeled pine, $18.50; rough pine, 14.00;

peeled hardwood, 17.50; rough hardwood, 13.00; peeled hemlock, 17.00, and rough hemlock, 12.50.

The order is contained in CPR 102 and was effective December 10. With slight variations, the regulation also set ceilings for two other zones in Maryland, Virginia, and West Virginia.

Wastepaper Purchases, Use in 11 Months Higher than Any Year

Consumption and purchases of wastepaper for the first 11 months of 1951 exceeded the totals for any previous complete year. This was announced early in December by the eastern conservation committee of Wastepaper Consuming Industries.

Mill receipts for the 11-month period were estimated at 8,400,000 tons. The previous high for a full year was 7,875,000 tons in 1947. Consumption during the period was about 8,250,000 tons, compared with the previous high of 8,009,000, also set in 1947.

By grade, purchases of news were at a new high, exceeding even mixed grades. In the East news consumption was reportedly running close to 30 per cent of total consumption, compared with 28 per cent in both 1950 and 1949.

Chicago dealers' paying prices, in dollars per hundredweights, on December 17 were as follows: miscellaneous mixed, .10n; folded-news, .20@ .25; old containers, .20; books and magazines, .75@ .90; brown kraft, .75@ .90; white news blanks, 1.25; miscellaneous hard white shavings, 3.50@ 4.00.

Mill paying prices, in dollars per ton, on the same date were as follows: No. 1 mixed, 10.00; No. 1 news, 15.00; No. 1 corrugated, 15.00; white news blanks (compressed bales), 50.00.

Market Termed Bleak

According to Chicago dealers, the wastepaper outlook for the last two weeks of December was bleak. Surveys indicated that paper and paperboard mill operations during the month would probably not exceed 12 or 13 days, compared to the normal 20 to 24-day production schedule. In past years wastepaper supplies tightened at the end of the year, as mills stepped up purchasing programs. However, late in 1951 mills were still digesting purchasing and production sprees of the last two quarters of 1950 and the first quarter of 1951.

In Chicago corrugated and folded news were in fair demand, moving at the established mill rate of $15. Corrugated was expected to be a problem after Christmas, unless demand picked up. Mixed remained a headache to dealers.

The mill shut-downs, plus the bad weather in much of the Midwest, which was expected to sharply curtail collections of paper, was looked to to ease the raw material oversupply problem of most paper mills in the Chicago area. It was also hoped that the bad weather would also help dealers who have not been able to move their accumulations.

Mill Inventories Remain High

Wastepaper inventories at many eastern paper mills are still at their highest point since the end of World War II, despite a 3 per cent reduction during October and November.

Greatest reductions were in old corrugated, although a small amount of news grades was reported taken from warehouse stocks and not replaced since the first of October. According to U. S. Department of Commerce figures, the nation's mills had 576,961 tons of wastepaper on hand at the end of September, against 412,699 at the end of January.

In the East the wastepaper market was so dead during November and December that one prominent packer was shipping his mixed grades to a New Jersey dump for burning. In one day alone more than 100 tons were put to the torch.

16,000-Pound Press Roller Readied for Maine Mill

Eight tons of westerly light pink granite are being shaped into a press roller for a paper machine at Smith Granite Works in Westerly, R.I. The machine is being assembled at Pusey & Jones Corp., Wilmington, Del., for Fraser Paper Ltd. for one of its Maine mills.

The single cylinder of solid granite will have a crushing strength of 39,000 pounds per square inch. Westerly granite was chosen because of superior crushing strength. It is described as a hard granite that can withstand not only great pressure but also the attack of acids and other chemicals used in paper making. The cylinder is 20 feet in length and 28 inches in diameter. A hole 11 inches in diameter must be accurately bored through its length to permit insertion of a gib steel shaft upon which the roller will turn.

Paper Industry Seen as Fla.'s Biggest in Five Years

A prediction that the paper industry would be Florida's biggest in five years was made December 6 by Gov. Fuller Warren in an address at Palatka during the dedication of the $10,000,000 addition to the Hudson Pulp & Paper Corp. plant. (See page 1148.)

Governor Warren declared that the new plant, which boosted to eight the number of Florida paper mills, would provide jobs for an additional 600 people and increase Hudson's payroll to nearly $5,000,000. He pointed out that three more paper mills to be built in Jacksonville and Port St. Joe would triple the state's production by the end of 1952 and "put Florida in competition with Louisiana for the lead in the southern paper industry."

Although paper manufacturing was non-existent in Florida 25 years ago, it now accounts for nearly 15 per cent of all industrial payrolls and pours some $35,000,000 annually into wholesale and retail channels alone.

St. Croix Paper Announces Pension and Retirement Plans

Approval of a funded pension plan for employees covered by collective bargaining agreements with the unions and of a similar plan for salaried and other hourly rated employees has been announced by St. Croix Paper Co., Woodland, Maine. Both plans are subject to the approval of the Treasury Department and the Wage and Salary Stabilization boards.

The effective date of both plans was December 1. The normal retirement age is 65, and all benefits and contributions cease thereafter. Under certain conditions, employees may continue working after 65. Provided is a non-contributory monthly benefit of $1.50 for each year of continuous service, with a maximum of 35 years. The plans also provide a contributory benefit, based on annual regular straight time earnings in excess of $3,600, of ½ per cent of such excess earnings prior to December 1, 1951, and 1 per cent thereafter as long as the employee contributes 3 per cent of his annual earnings in excess of $3,600. The plans permit a reduced early retirement benefit at age 60, after the completion of 20 years continuous service. There is a partial vesting of pension benefits after age 50 and the completion of 20 years continuous service.

Duties on Plasticized Papers Secured

The development of various plasticized papers in the United States has been followed by efforts of foreign manufacturers to ship competitive products into the U. S. However, the Import Committee of the American Paper Industry has recently secured a ruling from Customs officials that materially increases the amount of duty to be collected on one such product.

Importations of material composed of an absorbent kraft paper base with layers laminated with synthetic phenol resin had been claimed to be dutiable as wallboard at 10 per cent, or as laminated paperboard at $7.25 per ton. The Customs officials, however, have held that this product is not dutiable under the paper schedule, but under a special provision for laminated products in which synthetic resin is the chief binding agent

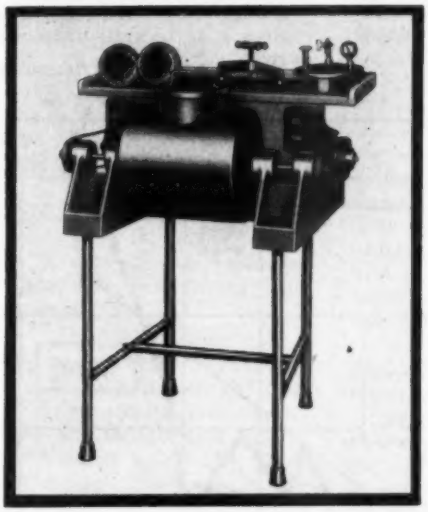
RICE BARTON

DynoPulpers

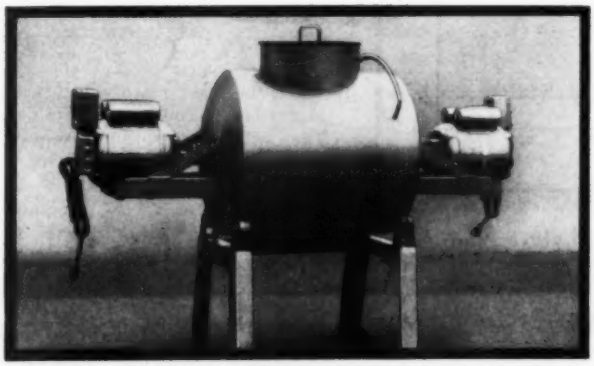
LABORATORY and PILOT MODELS

With them you can:

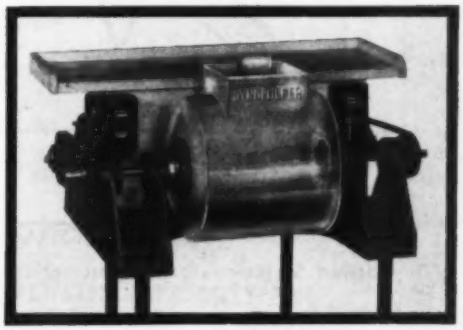
- **Evaluate Waste Paper and Pulp**
- **Recognize Wet Strength**
- **Determine Shrinkage in Waste Paper**
- **Establish Dirt Count on Pulp**
- **Match Colors (two minutes)**
- **Test Mixtures of Stock**



Model 3SP
Laboratory DynoPulper with Stainless Steel Vat. Can be used under pressure. Also available without pressure cover. Capacity 500 grams at 4% consistency.

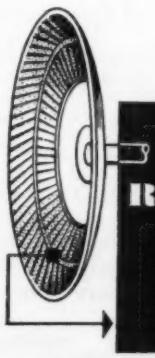


Model 18
Pilot Model DynoPulper. Available in Carbon Steel or Stainless Steel Vat. Capacity 10 lbs. at 4% consistency.



Model 3
Laboratory DynoPulper with Plexiglass Vat. Capacity 500 grams at 4% consistency.

The DynoPeller
is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock toward it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles under a gentle hydraulic pressure. This effective dynomizing action completely disintegrates the stock . . . separating each fiber from its neighbor while maintaining its original length.



These models available on a lease basis ($50.00 per month). Any charges will be deductible from the purchase price of a new lab model or a commercial machine.

RICE BARTON Research Corporation
WORCESTER 1, MASS.

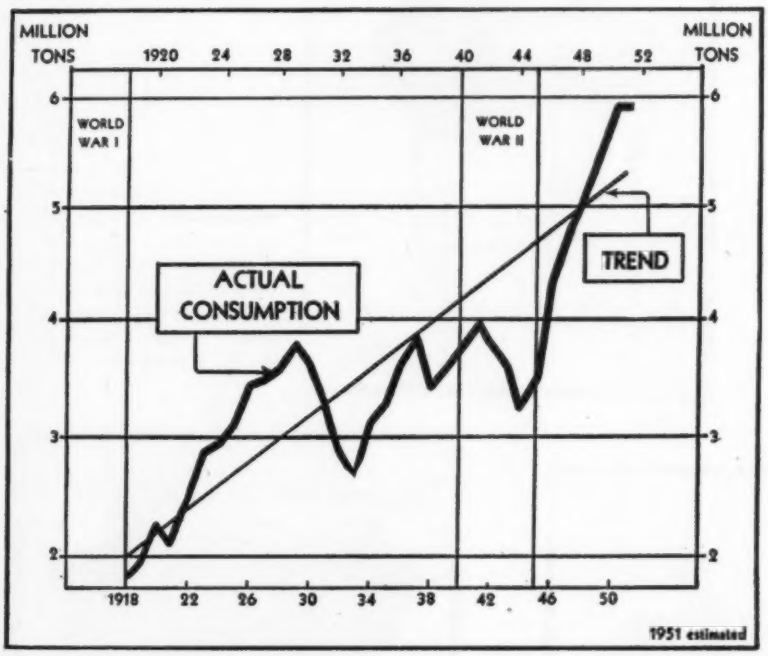
RBRI-52

at 7½ per cent per pound plus 12½ per cent ad valorem. With this ruling as a precedent, the Import Committee believes that other plasticized papers and paperboards, in which the phenol resin is the component of chief value, should be classified for duty under the higher duty provisions of the chemical schedule, rather than under the low rates of the paper schedule.

Custom Court Cases

After several months of study, Customs officials have ruled that paperboard made of bagasse is not dutiable at the reduced rate of 5 per cent for strawboard, but at 7½ per cent as paperboard not specially provided for, according to a report released by Warren B. Bullock, manager of the Import Committee.

If in thicknesses used for corrugating material for shipping containers, the bagasse material would be dutiable at 30 per cent as paper not specially provided for, rather than as 9-point straw at 7½ per cent. The ruling is particularly applicable to bagasse board over 12 points in thickness now being imported from Central America at the rate of about 100 tons per month. The Customs officials held in effect that to come under the strawboard provision the basic materials must be the waste stalks of cereal grains.



United States newsprint consumption and trend, 1918-1951

Newsprint Outlook Seen to be Improving During 1952

Signs of a slight easing in the severe newsprint shortage have been cited in the fifth annual report of the Newsprint Association of Canada. According to the survey, greater production will meet more than 97 per cent of the world's demand in 1951 and 1952. Rapid expansion of Canadian mills in response to growing demand was given as a major reason for the "slightly smaller shortage" this year.

Although the worldwide shortage in 1952 will be less than 3 per cent of demand, the shortage will be distributed unevenly and is expected to be as high as 8 per cent in some areas.

The NAC report said that the long-term trend of newsprint consumption in the United States has been upward but is unlikely to continue at the same rapid rate. Since the close of World War II demand has increased at the rate of 400,000 tons a year, but the 1951 increase was expected to be much smaller. U. S. consumers as a whole are using less than they are receiving, the inventories thus being rebuilt. The survey called the current period "one of readjustment, such as is to be expected in any growing industry. Its effect and duration remain to be seen." Consumers in the U. S. have been taking about 60 per cent of the world supply.

Canada and U. S. Predominant

Covered by the survey are 100 countries and separate dependent areas, with the greater portion devoted to the U. S. and Canada. There has always been a close relationship between Canadian production and U. S. consumption, and in recent years it has become closer still. Postwar expansion in the U. S. newspaper publishing industry has been made possible largely by the increase in production achieved by Canadian manufacturers. Throughout the postwar period most of the increase has gone to U. S. and Canadian users who have been anxious and able to buy, generally on a long-term basis, while many purchasers outside North America have been restrained by dollar shortages and governmental restrictions.

Canadian Performance

Canadian postwar expansion of capacity in response to demand has been accomplished by improvement of existing plants, by addition of new machines, and by new mill construction. In the five years following the war 719,000 tons of annual capacity were added, making a total annual newsprint capacity of 5,360,000 tons on January 1, 1951. By January 1, 1953, additional expansion now planned will add 365,000 tons, and already plans have been reported involving further substantial increases that will become effective after that date.

Further increases and the rate at which they take place will depend primarily on the course of future demand. They will also depend to a considerable extent upon the availability of larger quantities of scarce materials such as sulphur and the ability to obtain steel and other materials in view of the developing defense program.

Canadian Projects and Prospects

Current, prospective, and tentative developments affecting future newsprint production were listed in the NAC survey. According to the Association, some are known to be genuine, and on the way to completion, while others are of varying reliability and may or may not materialize.

Elk Falls Co. Ltd.: Opening date for the new mill at Duncan Bay, B.C., is scheduled for June 1. Estimated newsprint capacity is 75,000 tons initially and ultimately 100,000 tons per year.

Bowater's: Expenditure totalling $10,000,000 has been authorized to expand capacity of newsprint and sulphite pulp at Corner Brook, Newfoundland.

Powell River Co. Ltd.: May build a newsprint mill at Kitimat, B.C., site of

the new development of Aluminum Co. of Canada.

North Western Pulp & Paper Ltd.: Construction of a new mill is reported to have started at Yates, Alberta. The mill plans ultimate production of newsprint, but at first only groundwood will be manufactured.

Brompton Pulp & Paper Co. Ltd.: Expansion program at Red Rock, Ont., includes reconversion of the existing kraft paper machine to manufacture of newsprint, with the output to be 60,000 tons per year beginning in 1954.

Columbia Cellulose Co.: Arrow Lakes, B.C., is the proposed site of a pulp and newsprint plant.

U. S. Expansion

A similar list for U. S. projects was given in the NAC report.

Bowater's: Plans to build a new mill with newsprint capacity of 125,000 tons a year in Tennessee. This project is awaiting the granting of a certificate of necessity by the National Production Authority.

Knight Newspapers Inc.: Purchased the former St. Regis mill at Norfolk, N.Y., which has a potential newsprint output of about 50,000 tons per year.

Manistique Paper Mill: Recently purchased by Trenton Times Corp. from Mead Corp. Production is to be switched from wallpaper to provide 25,000 tons per year of newsprint for shipment under contract to about 25 newspapers in South America.

Gannett Newspapers: Have purchased Berwin Paper Mfg. Co. mill at Danville, N.Y. Mill to be converted to produce 15,000 tons of newsprint annually within the next two years.

West Tacoma Newsprint Co.: Planning an expansion program to double present newsprint capacity of 26,000 tons at mill at Steilacoom, Wash.

I. Lawrence LeSavoy: Cheboygan, Mich., mill has suspended production of carton paper and is now making newsprint and kraft.

United Bagasse Cellulose Corp.: Has been organized at Clewiston, Fla., to manufacture newsprint and other papers from sugar cane bagasse. The new plant's initial capacity will be 45,000 tons of newsprint annually.

White Star Paper Co.: Proposed pulp and paper mill at Prescott, Ark., has been granted a certificate of necessity for wood pulp by NPA, but construction has been delayed indefinitely due to increased costs and priorities on building materials. Original reports were that this mill would have one machine with a rated capacity of 50,000 tons of newsprint per year.

Louisiana Press Association: Has appointed a newsprint committee to establish a mill in Louisiana.

U. S. Increase Seen Near

Newsprint is to be declared essential in the near future, clearing the way for a 250,000-ton expansion of producing capacity. Arthur R. Treanor, retiring as director of the printing and publishing division of NPA, said the ruling he has sought for months will undoubtedly be favorable.

Mr. Treanor foresaw a slight improvement ahead in newsprint supply and a probability that it will not be necessary to impose a rationing system like that under which newspapers worked during World War II.

Government Actions

Expansion of newsprint production by 494,000 annual tons has been approved by DPA's office of program and requirements. The decision does not carry with it any assurances of priorities in construction. Approval of the expansion was given to allow the granting of certificates of necessity for rapid tax amortization of facilities for expanding newsprint production.

World Developments

In Oslo, Norway, the executive committee of the International Federation of Newspaper Publishers recently adopted a resolution dealing with the worldwide newsprint shortage. The resolution, forwarded to the UN general assembly in Paris, called for: (1) an equal sharing of the available newsprint; (2) thorough search for new raw materials for paper production, and (3) cutting of the existing newsprint prices.

Early in December a 50 per cent reduction in newsprint supplies to the Argentine press went into effect. The government said the move was made necessary by the world scarcity and the country's inability to import required quantities. Newspapers were warned that their usual weekly allotment would have to last two weeks from now on.

J. van de Kieft, of Holland, president of the International Newspaper Publishers Association, has told reporters that the price of newsprint is likely to increase another 40 per cent within the next year.

Quebec Price Cut

Under a new price adjustment based on shipping costs, Quebec newspapers will pay from $3 to $5 a ton less for newsprint. Mill spokesmen indicated that the new prices are not actual contract price slashes but rather pro rata adjustments based on shipping distances from mill. Canadian consumers traditionally pay $4 a ton less than the New York price, currently $116, despite a $13 a ton differential in shipping charges from Quebec.

Plan New Zealand Newsprint Mill

Construction of a newsprint mill in New Zealand costing approximately 30,000,000 Australian pounds has been announced by Prime Minister Holland. The combine formed for the project includes American interests.

The group consists of Merritt, Chapman & Scott Corp. and Raymond Concrete Pile Co., both of the U.S., and the New Zealand firm of Fletcher Construction Co.

New Elk Falls Sulphate Mill Sets Pace in Canadian Expansion

Elk Falls Co. has announced intentions of adding a sulphate mill to the half-finished newsprint mill it is constructing at Duncan Bay on Vancouver Island, B.C. Elk Falls is jointly owned by Pacific Mills (Crown Zellerbach's Canadian subsidiary) and Canadian Western Lumber Co.

No starting date or capital investment figure was given in conjunction with the announcement, and company officials declined to add this information. It is thought, however, that the necessary expenditure would be between $18,000,000 and $23,000,000.

Present development embodies a newsprint mill, but sulphite pulp is to be supplied by Pacific Mills' operations at Ocean Falls. A kraft mill will mean that waste can be utilized from the Canadian Western sawmilling operations, and also that species unsuitable for groundwood or sulphite production can be utilized.

Newsprint Mill Progresses

According to construction contractors, the newsprint mill now under construction at Duncan Bay is 55 per cent complete, including the main units. Supply lines for construction materials have been maintained without too much difficulty as designs were approved and principal items ordered prior to the defense program squeeze. Only a few scarce items have proven difficult.

Power transmission has been nearly completed by B. C. Power Commission, which is installing a 130,000-volt substation and transmission line. The pipe

ADVANCED STAGE OF CONSTRUCTION is shown in this view looking into the machine room, with the canopy over the machine wells. Space to the right is probably for another machine installation

PORTION OF THE 14,000-FOOT pipe line from Quinsam and Campbell Rivers to the 300,000-gallon main water storage and the 100,000-gallon fire protection storage tanks at the Elk Falls mill

line, which has a 10,000,000-gallon daily capacity, is also nearing completion. The line is 14,000 feet in length and 36 inches in diameter. It is to carry process water to a 300,000-gallon storage tank, which is completed. Also completed is a 100,000-gallon tank to be used for fire protection.

Construction is complete on the 150-foot smokestack. Installation of the permanent boiler is being delayed until the end of winter. A temporary boiler is supplying present needs. Also finished is the 400-foot wharf. Barges are arriving regularly, and approximately three cars carrying equipment are being unloaded every two weeks. A locomotive is operating on shore so that cars can be spotted close to the installation point. Deep sea vessels are now able to unload alongside the off-shore side of the wharf.

Run-in Planned for June

The main units of the mill are in a building 760 feet in length. This consists of the grinder room, screen room, machine room, and finishing room. From here newsprint will go to roll storage, a 480-foot building now being used as a warehouse for construction materials. This building was completed in mid-October. Grinder blocks will reach the grinders by means of a 400-foot flume from the sawmill. Six grinders are to be installed, with space provided for the addition of six more. In fact, consideration has been given to the possibility of doubling the entire production without adding any new buildings.

The 284-inch newsprint machine is being constructed in Montreal. It will have a rated capacity of 2,000 fpm and a daily output of about 240 tons. Latest word is the mill should be ready to run in about the first of June, with an opening ceremony planned for mid-September.

Dryden Approves Expansion Program

Directors of Dryden Paper Co. Ltd., Dryden, Ont., have approved an expansion program designed to increase annual capacity to 80,000 tons by the end of 1953. First stages of the project, which will cost an estimated $3,500,000, are to be started immediately.

Present plans call for the installation of a new recovery and evaporator plant, a modern refuse and lignite burning steam generating plant, a fresh water pumping plant, additional digesters and other equipment, together with paper machine changes for increasing the production of kraft products.

A second stage program of development to boost the annual capacity to 112,000 tons will be undertaken at a later date, as demand and economic conditions warrant.

Premier Duplessis of Quebec
announced recently that the government had taken over all assets of the Chicoutimi pulp mills of Quebec Pulp & Paper Corp. At the request of Liberal Leader George Marler, Premier Duplessis produced orders-in-council passed by the provincial cabinet. All assets, including water power and timber limits, were acquired by the government for $1,500,000. The premier noted that recently U.S. interests had laid before the Government of Quebec a plan for the reopening of the mills and that the government will work toward that end.

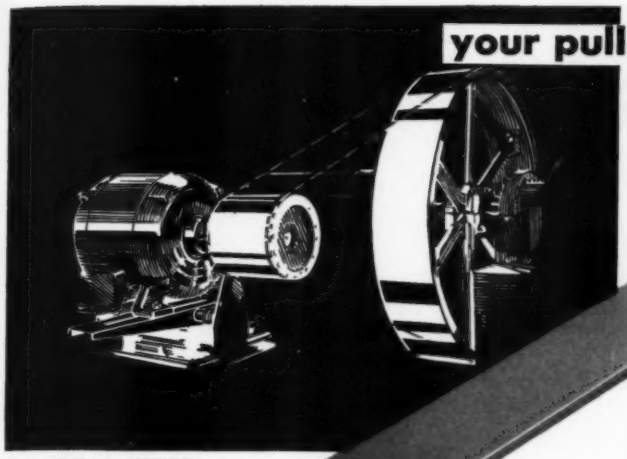
McCormick Dam,
being built by Quebec North Shore Paper Co. at Baie Comeau, Que., is expected to be in full use by 1953. Its diversion tunnel was holed through recently with 18 tons of dynamite. When completed, the new power plant will add 90,000 horse power to the paper mill supply.

Capital Envelope Co. Ltd.
has opened a new factory at Edmonton, Alberta. K. F. Martin has been appointed managing director.

Gair Co. of Canada Ltd.
is doubling the capacity of its corrugated shipping container production facilities at Toronto. Cost of the project has been estimated at $700,000. The expansion will provide 80,000 square feet of new space when completed late this summer.

Dixie Cup Co. of Canada Ltd.
is spending $300,000 on a new addition at its Toronto plant. The project is to be completed in the spring and will increase employment to 150 persons.

Columbia Cellulose,
Celanese Corp. of America's Canadian subsidiary, has announced that it will expand its newly opened high alpha pulp mill at Prince Rupert, B.C., from 200 to 300 tons daily. Original mill design



Graton & Knight RESEARCH leather belt on short-center controlled tension motor base drive.

your pulleys will drive your machines only as well as your belts drive your pulleys

if you want more production, get GRATON AND KNIGHT leather belting for more production-power

Get a Graton & Knight "Live Traction" Leather Belt — because it is engineered to transmit maximum uniform horsepower at correct speeds and sustained R.P.M. — with ample reserve for load peaks, and "fluid drive action" to absorb starting torque and load shocks.

For tough conditions, cross, shifter and idler drives, **HEART OAK** top grade center stock oak tannage. For short center, small pulley, cone pulley and serpentine *precision* drives, **RESEARCH®** premium quality. For ambient conditions (steam, oil, water, acid and alkali fumes) **SPARTAN®** combination tannage . . . Whatever your conditions, you'll get more production-power with Graton & Knight *Engineered* Leather Belting.

and *keep* your belts pulling for you

Stop belt slippage — prolong belt life with GRAKO® CLEAR Belt Dressing, result of 100 years experience in leather tanning and belt manufacture. Preserves and lubricates the fibres. Pint, quart and gallon cans — 5-gallon and 50-gallon drums. Send for circular.

New Belting Catalog and Manual shows how to get more production-power with leather belting. Our representative will deliver your (free) copy upon request. GRATON & KNIGHT COMPANY, Worcester 4, Massachusetts.

second centu G and K **engineered leather belting**

for more production-power

GRATON AND KNIGHT Estab. 1851

CUTS COSTS

REDUCES WASTE

PROTECTS QUALITY

Automatically

HURLETRON

Automatic

CALIPER and WEIGHT CONTROL

- **Holds wet end fluctuations to plus or minus one point**
- **Measures thickness at 40″ intervals clear across the sheet**
- **Makes corrections by regulating flow of stock but only when a trend has been established**
- **Provides a continuous, permanent record of wet end caliper**
- **Signals operator when a drift across the sheet is indicated**
- **Provides a continuous reading and record at the dry end**

WRITE FOR THIS BULLETIN

Our Bulletin No. 211 contains full details about the Hurletron Control together with photos, charts and diagrams. Ask for your copy today.

That's a big order . . . but the Hurletron Caliper and Weight Control goes all the way . . . maintains a density of plus or minus 1½% through a caliper range of 5 to 150 points.

At the wet end, every inch of the sheet is gauged. When an out-of-caliper trend is set up, stock flow is regulated to make correction. At the same time, a continuous record of caliper is maintained at both wet and dry ends. And all this is done automatically . . . without operator attention.

No guesswork . . . no manual adjustment of stock flow . . . no over or under correction . . . no question about the caliper and weight of every inch of the finished roll. It's easy to see why this modern equipment cuts costs to the bone . . . why waste is reduced to a minimum . . . why the finished product will be consistently uniform.

Hurletron Automatic Caliper and Weight Controls are doing this important work in many leading mills . . . repaying the original investment over and over again. Let us show you how you can enjoy these same advantages. Write today . . . there's no obligation.

ELECTRIC EYE EQUIPMENT COMPANY

10 WEST FAIRCHILD STREET, DANVILLE, ILLINOIS

was made to allow for this, and no additional buildings will be necessary, with the exception of a new water treatment construction that is already under way. Expansion will include a 25-ton digester, pumps, washers, and other similar equipment. There are at present five digesters in the mill.

Woodlots Encouraged in British Columbia

With mills in the lower mainland region of the Fraser Valley showing more and more interest in farm woodlot purchases, farmers in the area are showing keen interest in the plan provided in the Forest Act of 1948. A steadily increasing market has been evident in recent months.

Prior to the recent activity, woodlots did not receive the full attention given them in some parts of the United States and eastern Canada. Under provisions of the 1948 act, a farmer may realize 10,000 cubic feet of wood production annually from his holdings; if he does not own the necessary acreage, he may apply for a piece of Crown forest land large enough to realize the total. In the coastal regions this means approximately 100 acres of forest land; in the interior about 250 acres. In no instance may the total exceed 650 acres.

The land must be kept stocked with salable commercial species, with the Forest Service supplying the necessary seedlings where planting is necessary. There must be an annual or periodical harvest of wood on an allowable cut basis. Before the granting of a license, a simple management plan is drawn up by the farmer, his agent, or the Forest Service. If the latter prepares the plan, the farmer must aid in collecting the data.

All lands under such an agreement are tax exempt, but the owner must pay a royalty or stumpage price at the time of harvest based on the units of wood cut. The stumpage price is assessed by the Forest Service at what has recently proven to be a lower price than that bid for timber on the timber sales. The license terminates on the death of the owner or if the farm is sold, unless the new owner indicates a desire to continue under the terms of the agreement.

Pulpwood to Be Shipped from Churchill, Man.

The port of Churchill in northern Manitoba will ship 20,000 cords of pulpwood to France in 1952. The harbor usually handles grain exclusively.

Dr. A. Hubert of Zurich, Switzerland, a representative of the French and Swiss newspaper industries, said that six to eight ships will be required. Growth of pulpwood in the Churchill region is about one-third the rate of that in most pulp regions of Canada.

SCATTERING POISON WHEAT grains to kill rodents, this helicopter is shown flying above the MacMillan & Bloedel holdings. Ten days later it will scatter Douglas fir seed in the same manner, reforesting the land. Note specially designed hoppers on each side of the plane

Canadians Now Using Helicopters in Forestry

Helicopters are proving to be useful tools of forest management in many North American timberlands. They have been used successfully in the United States, particularly in the West Coast region. One or two isolated attempts at seeding have been made in British Columbia, but the rodent population has usually succeeded in making these efforts partially or wholly ineffective.

On Canada's west coast the rodent population has shown a sudden increase on logged areas, presumably because of the increase of tree seeds in the branches, the grasses, and the ground vegetation in general. Experiment has shown that one mouse is able to eat about 300 Douglas fir seeds per day, so direct seeding attempts without preparing the area have proved a failure.

B. C. Firm Experimenting

MacMillan & Bloedel Ltd., newly formed merged interests of H. R. MacMillan and Bloedel, Stewart & Welch, is carrying out an experimental program on two areas of 1,760 acres and 2,500 acres, respectively.

The area is first poisoned with wheat grains treated with a green dye. The colored wheat is then treated with 10-80 (sodium fluoroacetate) and thallium sulphate, and finally with an oil bath to prevent the poisons from washing away too rapidly.

A helicopter, flown under contract by Dean Johnson of McMinnville, Ore., is then loaded with 200 pounds of poisoned wheat, with two 50-pound bags being placed in hoppers on either side of the plane. Each of the hoppers is fitted with a specially designed scatterer with a hydraulically operated 14-inch disc, which spins, this giving a wide and even distribution to the grains.

Once the area is poisoned, it is allowed to stand 10 days, at which time another series of flights is made, scattering seed in the same manner. The 1,760-acre area has been seeded with Douglas fir; but since a sufficient seed source has been left near the 2,500-acre area, it is felt that poisoning will be sufficient to permit the seedlings to become established.

It has been found that 24 acres can be covered per minute while flying at 60 miles per hour at an altitude of about 350 feet. Each strip is 200 feet wide, which means that one seed is deposited every five feet.

Ontario Using Similar System

The Ontario Forest Service has also been using aircraft for similar work. Here, samples were taken with traps, and indications were that rodent populations were not above normal. In this case, direct seeding was carried out immediately.

Flying equipment has also demonstrated its usefulness in fire-fighting and fire prevention work. The woodlands section of the Canadian Pulp and Paper Association demonstrated tactics such as water bombing and spot fire attacking at the Pine Lake meeting last June.

Beaver aircraft were used for a reseeding project on a 55,000-acre tract of burned forest land at Gogama. Here, a 40 per cent mixture of red pine, Scotch

pine, spruce, and balsam was used with 60 per cent jack pine. Balloons were used to aid the pilot in flying his strips.

Alcan Timber Salvage May be Undertaken

At a recent meeting of the Canadian Institute of Foresters in Banff, first official mention was made of the previously reported salvage operation at the huge Aluminum Co. of Canada's development in British Columbia. Power development for this project will necessitate the flooding of about 300 square miles of prime timberland, and the Canadian foresters firmly backed a motion demanding that the government insist on the removal of all timber before flooding.

Dr. D. B. Turner of the Department of Lands and Forests stated that Powell River Co. was making surveys with the intention of establishing a pulp mill. It is expected that a management license would be set up under the provincial scheme, which would allow for the future needs of such an enterprise.

Powell River already holds about 1½ billion feet in the adjacent Kitimat region, plus an additional 2 billion on the Queen Charlotte Islands. As no power potential exists on these islands, a mill at Kitimat would be practical in view of the excess power to be developed by Alcan.

The salvage operation would be a new feature of Coast logging. Trees could be felled and bucked, to be left until the rising waters float them free. The remainder of the low-cost operation would consist of booming and towing to the land point nearest the mill.

A New Loading Technique
for pulpwood has been adopted at the port of Halifax. The pulpwood is towed in booms to a vessel anchored offshore. It is then loaded onto the boat from floating piers.

The University of New Brunswick
has awarded C. H. L. Jones scholarships to nine students. The scholarships are provided by Mersey Paper Co., Liverpool, Nova Scotia. Winners are George Buchan, Toronto; L. R. Pond, Three Rivers, Que.; Donald E. Bell and John S. MacTavish, Montreal; Murray M. Neilson, Deep River, Ont.; Robert H. Spurway, Fredericton; D. Gordon Mott, Dalhousie; William D. Beatty, Leaside, Ont., and I. F. Stewart, Tide Head, N.B.

Forest Land Auctioning
to increase government revenue has been proposed by George Marler, the Liberal leader in Quebec. He asked that forest concessions be issued by auction to newsprint firms. His reason was that since 1946 the rate charged by the government has remained at $500 per square mile, while during the same period the value of newsprint and the production of paper have risen greatly. His proposal was answered by the minister of forests, who said that the government often charged as much as $1,000 per square mile, $500 being the minimum. An inventory taken by the forestry department determines the government charge.

Bathurst Power & Paper Co. Ltd.
has admitted 35 long-service employees to membership in its Quarter Century Club. Each was presented a gold watch at the Club's annual anniversary dinner. Of the total membership of 213, 158 are still in active employment, while 37 others have retired. Presiding at the dinner was J. G. Chalmers, administrative vice president and a charter member.

New Brunswick International
Paper Co. recently presented a check for $25,000 to the Sacred Heart Convent at Dalhousie, N.B., as part of the firm's donation to the new St. Joseph's Hospital. The company will give a total of $50,000 to the project.

Columbia Cellulose Co. Ltd.,
Prince Rupert, B.C., has recently proposed a series of courses in pulp mill operation for night school classes in that city. The courses are to be open to all members of the community, and as long as there is a minimum of 25 registrations the high school principal is to go ahead with the proposal. The course will comprise a series of 10 lectures, and it is hoped that it will aid interested citizens to learn just what the pulp and paper industry is and what occurs in the various processes at the plant. Ray Jones, mill manager, and his technical staff at Columbia Cellulose will lecture.

The First British Commonwealth
Forestry Conference to be held in Canada for 25 years is scheduled for August. The gathering is expected to attract about 60 representatives from other members of the Commonwealth and an equal number from Canada and the United States. Chairman of the proceedings will be Dr. D. A. MacDonald, director of the Ottawa forestry branch of the Department of Resources and Development. Headquarters for the meeting will be in Toronto.

Wisconsin Mills Lead in Sulphite Pollution Research

Technical progress in the utilization of spent sulphite liquor in Wisconsin is lessening that state's stream pollution problem. Working in conjunction with the Institute of Paper Chemistry in Appleton and through their own Sulphite Manufacturers' Research League, pulp and paper mills throughout the state are devoting more and more funds toward research in the field.

Elsewhere in the country, major strides have been taken in combatting the life-killing pollution by spent liquor. Recently, in Kalamazoo, Mich., the Michigan Water Resources Commission ordered valley paper mills to reduce river pollution by September 1, 1955. Already a commercial deinking waste water treatment plant has been erected, and now the related problem of sludge accumulation is being tackled. Oregon mills situated along the banks of the Willamette River have joined in sponsoring a comprehensive report evaluating the self-purification capacity of the river at various levels.

Extensive Research in Wisconsin

In Wisconsin, where experiments have been made for the utilization of spent sulphite liquor as road binder, fertilizer, as a yeast base for pet foods, and as an industrial fuel, hundreds of thousands of dollars are being spent by members of the Sulphite Manufacturers' Research League for plant installations and further research.

Second Evaporator Installed

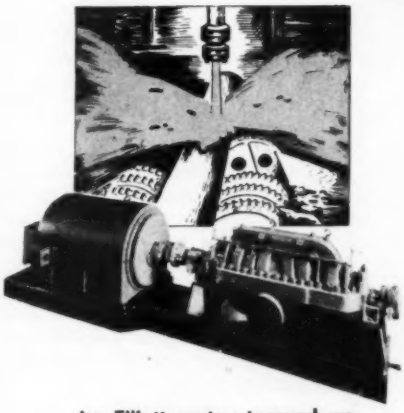
Expanded research on evaporating spent sulphite liquor for burning and other uses was to get under way about November 1 with the installation of a second experimental evaporator at the pilot plant of the Research League in Appleton. The only other evaporator in Wisconsin capable of concentrating spent sulphite liquor is a two-year-old Swedish-made reverse-flow unit now operated by the League. This installation has been operating at capacity since its construction, concentrating spent liquor from various mills in the state for burning and other tests.

The new evaporator is of a type that has been successfully used in many chemical industries but has never been extensively tested on spent sulphite liquor. However, laboratory-scale experiments have been encouraging.

According to Averill J. Wiley, League technical director, the principal problem is concerned with removing water from the spent liquor by evaporation, but lime salts in the liquor tend to crystallize in deposits on the hot surface of the evaporator and thereby put the evaporator

No roof needed with the ELLIOTT OUTDOOR SPLASHPROOF MOTOR

Elliott FABRI-STEEL MOTORS AND GENERATORS



An Elliott motor teamed up with a Bingham pump for hydraulic barking.

SAVE THE COST OF HOUSING for motor-driven pump units, by using motors that supply their own housing, proof against wind-driven rain, mist, fog, snow, sleet and temperature. Motors you can set up outdoors, wherever is most convenient for the work they have to do.

Elliott "Fabri-Steel" construction permits of motor design ideally suited to the need, providing the rigidity, crack-proof strength, and rugged endurance which combine with other Elliott refinements to produce a motor outstandingly dependable, whether on a hydraulic barking pump drive, a chipper drive, a boiler feed pump drive or any other motor application.

Sizes from 50 hp up, all enclosures, all types. Write for bulletin on the motor you need.

ELLIOTT Company

DEPT. P.I.

Ridgway Division

RIDGWAY, PA.

L-824

Plants at: JEANNETTE, PA. • RIDGWAY, PA.
AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.
DISTRICT OFFICES IN PRINCIPAL CITIES

out of commission. The new evaporator operates on the principle that the lime salts would rather crystallize out on small particles of the same lime material than on the evaporator wall. It accordingly provides a bed of lime salts to attract the crystallization away from the evaporator surfaces. If this proves successful with spent sulphite liquor, it will permit using an evaporator of simpler design than any equipment previously developed for the purpose.

Interlake Mill Progress

The program to reduce sulphite pollution of the Fox River at Appleton which has been undertaken by the Interlake Mill of Consolidated Water Power & Paper Co. shows prospects of early completion. This was revealed in a progress report made by Consolidated to the Wisconsin State Board of Health and Committee on Water Pollution.

Early this year the pollution committee accepted the firm's plans for reducing pollution at the mill. Following extensive experiment, Consolidated ordered an evaporator from General American Transportation Co. for treating the liquor so that it may be used as industrial fuel. The evaporator is of the Rosenblad type for concentrating the liquor to 60 per cent solids. However, General American has informed Consolidated that the current shortage of stainless steel might delay delivery. The steel is scheduled for rolling this month, and if government priorities do not sidetrack the project, the completed evaporator should be delivered to Interlake by April 1952. Two months will be required to assemble the unit at the construction site.

Company engineers are currently at work on a project to create the site for the structure which will house the evaporator. Bulldozers, trucks, and power shovels are building a piece of land at a point where the tail-race of the mill stream has been located. It has been estimated that 15,000 cubic feet of earth will be required. It was first necessary to reroute the stream that carries pulpwood logs to the incoming wood conveyor through a five-foot tile. Then a hill behind the mill was cut down to acquire soil for filling in the tail-race. Weather permitting, concrete footings are to be poured for the evaporator building.

Ammonium Base Used

Rhinelander Paper Co. has recently concluded an experiment with the ammonium base process of sulphite pulp manufacture. Although the test was of insufficient duration to prove conclusive, Rhinelander believes the resultant product satisfactory in all respects. One of the firm's eight digesters used the ammonium process for more than two weeks, instead of the calcium base process long conventional in Wisconsin.

Prior to the Consolidated experiment, Wausau Paper Mills Co., Brokaw, instituted a long-term experimental run on ammonium-base pulping. Company officials expressed the hope that ammonium base spent sulphite liquor may prove simpler to concentrate without scaling, thus making it easier to reduce pollution by burning the liquor. Ammonium base produces a more soluble type spent liquor, and on this depends the success of a better way to reduce stream pollution. Second only to the possible effect of reducing stream pollution is the hope that the use of ammonium-base pulping may reduce the consumption of sulphur.

During late summer Marathon Corp. began a similar experiment at its Rothschild mill. No report on the results of the project have been made public as yet.

Ultimate purpose of experimenting with ammonium base is to find more practical ways than calcium base liquor affords for reducing sulphite pollution in streams. The Rhinelander mill already treats much of its calcium base spent sulphite liquor by the torula yeast process, and weeks or months of testing are expected to be required for determining whether ammonium base liquor will respond equally well to the torula treatment.

An obstacle to early adoption of the ammonium process, even should it prove satisfactory, is the shortage of industrial ammonia. Company officials doubt that they could acquire the ammonia necessary for a plant-wide conversion, hence face no immediate decision between the two processes.

Green Bay Project

Northern Paper Mills is remodeling one of its buildings to house a giant stainless steel evaporator which the firm will use to boil most of the water out of its spent sulphite liquor. Northern ordered equipment for its evaporation-and-burning plant last February, immediately after state pollution authorities had approved the engineering plans. The evaporator, of Swedish Rosenblad design, is being built by General American Transportation Corp.

However, plans are being delayed due to the scarcity of the type of stainless steel required. Because of the shortage, the Wisconsin State Board of Health and Committee on Water Pollution last month granted Northern a one-year extension to the official order requiring substantial reduction of the flow of spent liquor flowing into the Fox River. The firm is now required to have its liquor treatment and disposal plant in operation by the end of 1952. Meanwhile, Northern is making its spent sulphite liquor available to city and county authorities for use as binder on unpaved streets and roads.

The remodeling project now under way calls for the brick walls of the building to be reinforced with steel. In addition, the roof is being removed to permit the addition of 10 feet to the height of the structure. Next step is to be the construction of a steel framework capable of supporting the 150-ton evaporator.

U. S. Health Service Acts

Enactment of effective legislation by all states to deal with the rapidly increasing problem of water pollution has been officially advocated by the United States Public Health Service. It is suggested that the states act with the aid of a draft prepared by the Health Service, state officials, and other consultants and recommended by the Council of State Governments.

Principles embodied in the proposed model law include: (1) a broad definition of pollution to permit action on any form of unanticipated, unexpected pollution; (2) a single independent agency in each state with comprehensive powers to deal with all users of water; (3) no exemptions from or exceptions to this authority to control pollution; (4) adequate enforcement powers designed to prevent stalling by means of long drawn-out court proceedings, and (5) the responsibility and authority for the agency to establish standards and to issue permits for the use of water.

Legislative Review

Proposals for more stringent laws against pollution of rivers and other waters by industrial wastes and untreated sewage have been enacted this year by several states, while being rejected in others. During 1951 sessions 52 bills were introduced in 21 state legislatures.

Currently pending before Congress are three bills which would permit the amortization of expenditures for waste treatment facilities over a 60-month period for income tax purposes. These are the Kefauver Bill S. 1472, the Tollefson Bill HR 1555, and the Simpson Bill HR 2752. The Kefauver Bill is a companion bill to those of Tollefson and Simpson. None is currently scheduled for committee action.

California communities are making arrangements to treat domestic and industrial wastes. The state-wide program is administered by nine regional offices and one state board. *Colorado* legislators this year unsuccessfully introduced a bill which would have created a five-man state water pollution control committee. Opposition to the measure was led by the state water board, which contended it would disrupt the state's water law and would interfere with stream alloca-

You'll get tight rolls every time

... with this Uniform Speed Reel!

You too can have the many cost-saving advantages of this up-to-the-minute Manchester Uniform Speed Reel.

This Pope Type Reel assures uniform tight rolls. No more cutting, printing, creasing and other complaints from your customers. It's equipped with anti-friction bearings, ample size gears in steel housings, and can be supplied with hydraulically or manually operated transfer arms. Other modern features are the adjustable spreader bar, adjustable doctor, and replaceable roll core holders.

A word from you will bring all the facts. Write today.

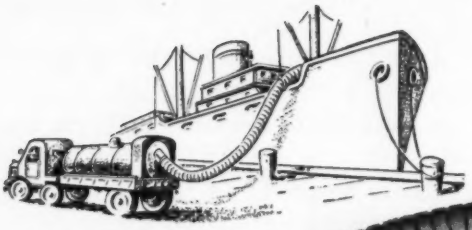
A Few Other Manchester Products

DRUM WINDERS • SUCTION DRUM ROLLS • SIZE PRESSES • RUBBER-COVERED DRILLED SUCTION PRESS ROLLS • DRILLED SUCTION COUCH ROLLS • SHAKE MOTIONS • PAPER MACHINE DRIVES CYLINDER MOULDS • COMPLETE FOURDRINIER • ROLL GRINDING

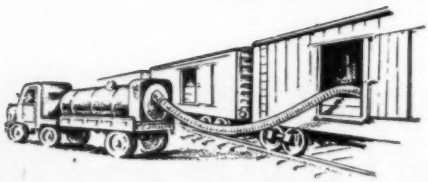
THE MANCHESTER MACHINE COMPANY

1911 CENTRAL AVE. • MIDDLETOWN, OHIO

SPECIALISTS IN PAPER MILL MACHINERY AND COMPLETE REPAIR SERVICE



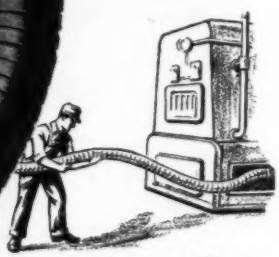
SHIP UNLOADING



GRAIN UNLOADING

8" Penflex #20 galvanized steel tubing attached to Sutorbilt blower at Proctor & Gamble dock on west coast.

INSULATION BLOWING



ASH REMOVAL

PENFLEX TAKES THE BITE OUT OF SHARP-TOOTHED CARGOES

PENFLEX FLEXIBLE TUBING MOVES ABRASIVE COPRA—PROVIDES SMOOTH-FLOWING, FLEXIBLE TRANSMISSION —RUGGED RESISTANCE TO WEAR

Unloading abrasive copra is a tough ship-to-shore operation which often spells quick death for conveyor tubing. Jagged chunks of copra eat away ordinary metal tubing—tear rubber hose to shreds.

Wherever "smooth throat" Penflex tubing is on the job, roughest cargoes go down easily. Penflex tubing—tough, smooth and flexible—flows roughest materials evenly . . . eliminates costly clogging and stoppages. And Penflex means flexibility too. Hose moves freely in the hold, absorbs vibration from machines, takes up movement of the ship due to tide changes.

For help with all your tough tubing problems, just call in your Penflex engineer. Penflex makes a complete line of four-wall, interlocked and seamless welded corrugated tubing—from ⅛" I.D. up ...automatic barrel fillers, accessories, fittings, and pneumatic rivet passers. Write for illustrated folder "Flexineering," containing valuable flexible tubing data for your particular product application.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7240 Powers Lane, Phila. 42, Pa.
Branch Sales Offices: **Boston • New York • Chicago • Houston • Cleveland • Los Angeles**

penflex

HEART OF INDUSTRY'S LIFE LINES

tions. *Delaware's* Water Pollution Commission, acting under authority of a 1949 state law, has taken its first specific steps toward prevention of new or increased industrial or municipal stream pollution.

Montana's legislature has rejected a bill that would have appropriated funds for an interim study of stream pollution. *Nebraska's* legislature has rejected a bill proposing the creation of a water pollution control council in the State Health Department. The measure was opposed by representatives of both industries and municipalities, with the latter complaining that the bill made no provision for cities to acquire the funds necessary for construction of waste treatment plants. *North Carolina* legislators have enacted a law creating a State Stream Sanitation Commission with the power to classify streams and order industrial plants to halt pollution.

North Dakota's senate has killed a bill providing for control, prevention, and abatement of water pollution. *Pennsylvania* lawmakers have turned down a bill which would have permitted continuation of dumping industrial wastes into streams for a period extending two years after the Korean War or until any "national emergency" ends. Opponents charged that the measure would have crippled the state's clean streams program. Meanwhile, the Pennsylvania state secretary of forests and waters has announced that the multi-million dollar Schuylkill River desilting project will be finished by June 1952. With completion of the state's share of the $35,000,000 project, however, there remains a substantial amount of work to be done by the federal government before the reclamation program actually is ready for operation. *Utah* legislators have refused to pass a bill creating a state water pollution control board with extensive powers. However, the state senate has requested the State Legislative Council to conduct an interim study of the problem.

Wisconsin has demonstrated one of the most aggressive anti-pollution campaigns of any state. During 1950 there was $4,301,000 worth of new construction and improvements in 23 cities, as compared to $3,492,000 in the 1949 period, when the state campaign really got under way. About three times as much anti-pollution construction work is now being carried out than in 1949. *Wyoming's* legislature has enacted a bill strengthening the powers of the State Health Department regarding the control of stream pollution. The measure provides for the establishment of a council of state agencies, including the health department, game and fish commission, agriculture commission, and five other members, one of whom shall be a representative of industry and one a representative of municipal governments. States in which legislative proposals are still pending include *Florida, Maine, Massachusetts, New Hampshire,* and *Vermont.*

10,000 Treatment Plants Needed

A report made public at the annual conference in Washington, D.C., of the State Sanitary Engineers estimates that 10,000 new sewage treatment plants are needed to maintain the nation's health. The report estimated that a 10-year construction program to cost between $9,000,000 and $12,000,000 is required to keep the nation's water supply usable in view of imminent industrial and population growth. The data on which the estimate is based is incomplete, and does not include 1,600 municipalities and 5,500 industrial establishments still to be reported on.

Among other significant points, the report revealed that studies thus far have shown more than 22,000 sources of water pollution in the nation, divided almost equally among 11,800 municipal sewer systems and 10,400 independent industrial waste outlets.

90,000 Trees to be Planted by Michigan County

Marquette (Mich.) County forestry officials have announced that a program has been instituted to plant some 90,000 trees on 14,000 acres of county-owned land near Sawyer. Land to be planted consists of burned-over jack pine areas not capable of natural seeding. Additional trees are to be planted each year as finances permit.

The Chicago & North Western Railway has made a tree-planting machine available to county officials. The program is being carried out in cooperation with the Michigan State College Extension Service. It is hoped that in the future some spruce and red pine can be planted on the better sites.

Planting is performed by the county road commission under the direction of H. L. Shroeger. Melvin Nyquist, county agricultural agent, is in charge of training a crew in proper planting methods.

United Wallpaper to Introduce New Line Yearly

United Wallpaper Inc. has announced plans to introduce new lines each year instead of every other year, which has been the company's policy since 1946. The action was taken to prevent the slack periods that resulted in alternate years under the former plan.

According to United, skilled employees were lost to other industries during the slack periods. The company has been showing deficits in alternate years and profits in other years. The "up and down" requirements for raw materials also had an adverse effect on supplies.

W. H. Yates, president of United, has said that the new policy will cost no more. With the two-year line, the firm had about 500 paper designs in 1,800 color combinations and changed all of them in alternate years. Under the new program, there will be about 400 patterns in 1,400 color combinations in the annual lines, with 30 to 35 per cent of the line being carried over.

Government Develops "All-Glass Paper"

The National Bureau of Standards, Washington, D.C., has announced the development of a new kind of paper made solely from spun glass and water. According to NBS, the paper will be particularly valuable for gas mask filters.

The raw material, commercially available fine glass fibers, was mixed with water and formed into continuous sheets on the Bureau's semi-commercial paper machine. A 1 per cent glass concentration in the glass-and-water beater stock gave a stronger paper than higher concentrations, but further dilution had no advantage. Short beater times—just long enough to separate the glass fibers—were best. The stock was flowed onto a 29-inch Fourdrinier having a 70-mesh wire 33 feet in length. From the endless-belt wire screen, the wet glass-paper sheet passed between special rollers, through a series of dryers, and onto a reel.

It was found that the wet paper could not be passed through metal rollers without weakening and pinholing. With a cushioning jacket on the first roll, however, the wet paper was satisfactorily pressed against the felt surface under the paper with minimal injury to the fibers. Commercial glass fibers of the finest diameter gave papers with the best strength and filtering characteristics. Other experiments showed that strength depends on the presence of fibers of assorted lengths, but that very short fibers weaken the paper if present in substantial quantity.

Other important advantages of the all-glass paper, according to the Bureau, are its high resistance to heat, moisture, chemicals and micro-organisms, and its excellent electrical characteristics.

Maine Foundation Announces New Members and Subscribers

John B. Calkin, secretary of the University of Maine Pulp and Paper Foundation, has announced the names of several concerns which have recently become company members or special subscribers to the Foundation.

The new list of company members includes Downingtown Mfg. Co., Downingtown, Pa.; Robert Gair Co., Inc., Uncasville, Conn.; P. H. Glatfelter Co.,

Spring Grove, Pa.; John A. Manning Paper Co., Inc., Troy, N.Y.; Mohawk Paper Mills, Inc., Cohoes, N.Y.; J. O. Ross Engineering Corp., New York, N. Y.; Rust Engineering Co., Pittsburgh, and Fitchburg Paper Co., Fitchburg, Mass.

The special subscribers include Bird Machine Co., South Walpole, Mass.; Cheney Bigelow Wire Works, Springfield, Mass.; Parkman A. Collins Co., Boston; Improved Paper Machinery Corp., Nashua, N.H.; Chas. T. Main, Inc., Boston; Norton Co., Worcester, Mass.; Papermakers Felt Association, Canton, Mass.; Riegel Paper Corp., New York, N.Y.; Rogers Fibre Co., Inc., Kennebunk, Maine; Peter J. Schweitzer, Inc., New York, N.Y., and Socony-Vacuum Oil Co., New York, N.Y.

The Foundation, established about two years ago, is designed to interest students in the university's pulp and paper program, to provide loans and scholarships for these students, to interest students and men from industry in advanced study, to screen outstanding students for the five-year operational management program, to augment the teaching staff, and to advance fundamental and applied research.

McLaurin-Jones Establishes Fellowship at Lowell

Establishment of a $500 annual scholarship for a student in the paper engineering course was announced recently by Lowell Textile Institute, Lowell, Mass. The fund was created by McLaurin-Jones Co., Brookfield. The scholarship is to be awarded on the basis of rank achieved in the scholastic aptitude section of the College Board Examination, on the applicant's high school record, and on the recommendations of high school principals.

First preference will be given to employees of McLaurin-Jones and their sons who graduate from any high school this June, and, secondly, to 1952 graduates of Brookfield and Ware high schools. Actual selection of the recipient is to be made by the Institute's scholarship committee.

Procurement Discussed at Quartermaster Meeting

Members of the Kraft Paper and Waterproof Paper divisions of the Quartermaster Association's Paper and Paper Products Industrial Group met December 4 with officials of the New York Quartermaster Procurement Agency. Procurement and production problems were discussed. Serving as the government presiding officer was Col. H. R. McKenzie, chief of the QM purchasing division; Wayne A. Brown of Crown Zellerbach Corp., New York, N.Y., was acting chairman.

Others scheduled to attend the meeting included George Stuhr, International Paper Corp.; H. S. Daniels, Union Bag & Paper Corp.; Dernell Every, Kraft Paper Association, and Walter Shorter, Camp Mfg. Co., all of the Kraft Paper Division; and Philip O. Deitsch, Waterproof Paper Manufacturers Association; W. P. Drew and H. H. Maynes, Arkell Safety Bag Co.; Leif B. Norstrand, Specialty Converters, Inc.; J. D. Johnston, Union Bag & Paper Corp.; Robert H. Wood, Simplex Paper Corp., and J. P. Grady and E. S. Elgin, Chase Bag Co., all of the Waterproof Paper Division. Frank C. Elliott of the procurement branch represented the Office of the Quartermaster General.

New Scholarship Announced at Western Michigan

The pulp and paper scholarship committee at Western Michigan College, Kalamazoo, has announced that application may now be submitted for the newly established $1,600 Hawthorne Paper Co.—William Slavin Scholarship. The award has been established by Mr. Slavin, president of Hawthorne, for the purpose of encouraging local high school graduates to enter the school's pulp and paper curriculum. Recipients of the scholarship are to receive $400 a year for four years, provided an adequate scholastic standing is maintained.

Application may be made by any graduate of Kalamazoo area high schools who is qualified to enter the pulp and paper technology curriculum in February. Freshmen now enrolled at the college who attended a Kalamazoo high school are also eligible.

4-H Club Foresters Win $300 Scholarships

Four National 4-H Club forestry champions were awarded $300 scholarships by American Forest Products Industries, Inc., recently for their projects in woodlot management. The awards were made at the National 4-H Club Congress in Chicago. In addition to the scholarships, each of the winners had his expenses to and from the Congress paid by APFI.

Carol L. Bennett, 17, of Hornell, N.Y., earned her scholarship by planting 4,000 red pine seedlings in an erosion control project on her father's farm. James Willard Colston, 15, Cornelia, Ga., gained his Chicago trip and the $300 scholarship by practicing money-making forest management on his father's woodlot. In six years of 4-H forestry work young Colston earned $6,530 from sale of selectively cut sawlogs and pulpwood.

Leonard Clell Miller, 19, of Pontotoc, Miss., was awarded the scholarship for managing his own 140-acre farm and woodlot. In six years he planted 24,000 pine seedlings to restore forest growth on hilly fields badly eroded by years of row-cropping. In five years he showed a net profit of $3,371 from sale of selectively harvested timber crops. Donald J. Freshour, 14-year-old farm boy of Ignatius, Mont., received the honors for establishing a woodlot on his father's ranch. Beginning with five acres of woods that had long been considered worthless, he developed in four years a woodlot that has become a community show place.

Industry Notes

Doubled Capacity is Planned
for the West Florida Nursery in Munson. The state forest service is undertaking the project in an effort to head off a 1952 seedling shortage similar to the pinch felt this year. Completion of the expansion in time for the 1952 crop depends solely on the availability of pipe for irrigation. Adequate land for hiking output from 10,000,000 to 20,000,000 seedlings is already prepared. Another nursery operated by the forest service, located at Olustee, is being enlarged as funds become available. The two nurseries have a total capacity of 28,000,000 plants but usually only about 20,000,000 survive for transplanting. Requests for seedlings this year totaled 43,000,000.

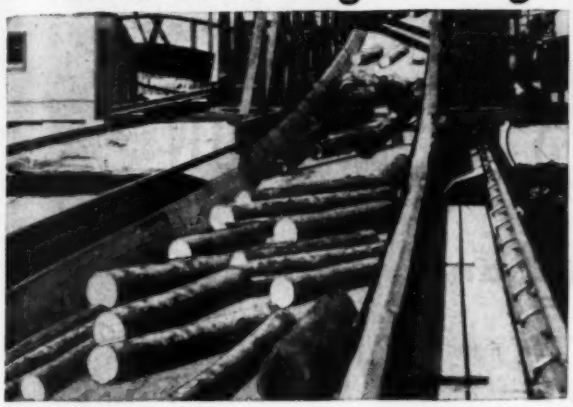
145 Living Units
in the village of Deferiet, N.Y., will be sold by St. Regis Paper Co. to its employees on a low-cost basis. Included are 101 houses and four apartments. Preliminary surveys have been started toward assessing the properties as the first step in the mass sale.

100 Pulpwood Cars
and three diesel engines are being added to the rolling stock of the Gulf, Mobile & Ohio Railroad. The pulp cars, necessary to meet the increased demand of the southern pulp industry, are to be built in the company's shops at a cost of $1,125,000.

More than $250,000
was paid to forest owners in Greenwood County, S.C., last year in the sale of pulpwood. A report by the state forestry commission shows that 22,080 cords were harvested. The price averaged $12.50 per cord.

Wood in Paper Form
that is used to construct low-cost houses was described to the Escanaba (Mich.) Rotary Club recently by Dr. J. Alfred Hall, director of the Forest Products Laboratory, Madison, Wis. Paper is now made from a variety of woods previously considered worthless for such purposes, Dr. Hall declared. A paper house of

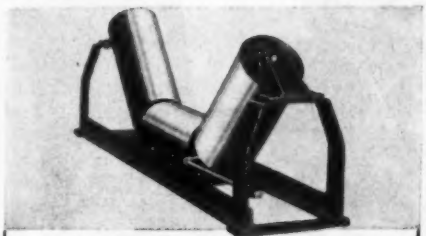
LINK-BELT engineering experience...



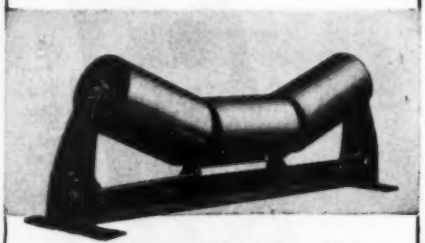
PULPWOOD LOGS are carried on log handling belt conveyor to stacker which discharges pulpwood to stockpiles.

TRANSFER of wood chips from one Link-Belt belt conveyor to another, both using 45° troughed belt idlers.

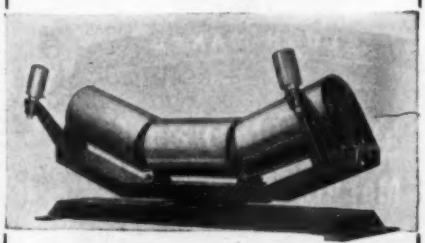
Plus LINK-BELT quality components...



45° TROUGHED BELT IDLERS for wood chips carry larger volume per lineal foot, resulting in lower cost per ton handled.



SERIES 100 TROUGHED BELT IDLERS. Strong, balanced integral rolls revolve on high-grade roller bearings, Grease-in, dirt-out seal, large reservoir preserve lubricant.



BELT-TRAINING IDLER for automatic belt positioning. The actuating rolls respond to slightest contact — quickly recede and center the belt to minimize wear.

...add up to your best bet in

BELT CONVEYORS

FOR logs, chips, chemicals and other bulk materials, Link-Belt Belt Conveyors pay off in high capacity and low-cost handling.

Whatever the conditions, you'll find the right answers at Link-Belt. For Link-Belt designs conveyor systems to meet your requirements. Backed by unmatched materials handling and power transmission experience, our conveyor specialists help you and your consultants get the right equipment in the right place.

One Source—One Responsibility

Link-Belt makes all the various elements—all types and sizes of idlers, takeups, pulleys, trippers, bearings and power transmission drives. Plus all related equipment—other types of conveyors, feeders, elevators, car dumpers and shakers.

And Link-Belt will build your supporting structures and enclosures . . . install the job completely. One source — one responsibility. Every detail receives the proper attention to assure you an efficient, trouble-free, long-life conveying system.

The next time you need belt conveyor engineering assistance, call the Link-Belt specialist in our office near you.

LINK-BELT

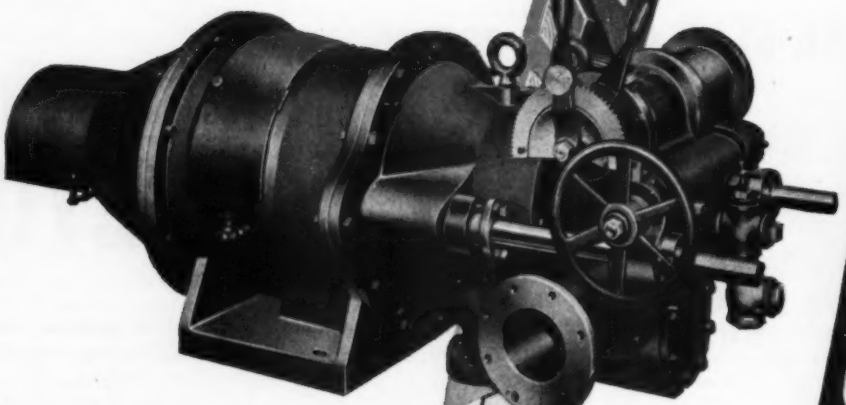
BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,512

ONE CONTINUOUS OPERATION

COMBINES BEATING and REFINING

SAVES SPACE • POWER • LABOR • MAINTENANCE



MORDEN "STOCK-MAKER"

The "Stock-Maker" combines the best time-proven principles of beating and refining into one compact, versatile and rugged unit, using...

1. **360° of bed plate shell (floating mounted for uniform pressure on all bars) surrounding a beater-roll type of rotor for the most efficient treatment.**
2. **Opposing internal flow pressures seal the stock between the treating elements and hold the fiber on the bar surfaces for complete and uniform treatment.**
3. **Optional internal blending or recirculation of a portion of the fibers for varying the individual fiber treatment on grades where this is advantageous.**

The simplicity, efficiency and advantages of these and other distinctive "Stock-Maker" features are proven by years of mill experience with hundreds of "Stock-Maker" installations on all types of pulps and grades of paper.

May we assist you with your beating and refining? Let us know your requirements.

SLUSH-MAKER

MORDEN
Machines Company

STOCK-MAKER

CORBETT BUILDING
PORTLAND 4, OREGON

corrugated paper and plywood has been successfully constructed at the Madison laboratory. This "paper house" is strong and is high in insulating quality.

Georgia Power Co.'s
demonstration farm near Milledgeville, Ga., was dedicated as a tree farm December 10. George Powers, farm manager, received a tree farm citation and certificate for his work in tree cultivation.

1951 "Best of Industry"
Direct Mail Contest awards were presented recently to Mohawk Paper Mills, Inc., Cohoes, N.Y., and to Dennison Mfg. Co., Framingham, Mass. The competition for direct mail advertising campaigns is presented each year by the Direct Mail Advertising Association. The presentations were made at the Association's 34th annual conference, held this year in Milwaukee.

Fire Endangered
the sulphite plant of St. Regis Paper Co. in Deferiet, N.Y., recently, but was controlled by firemen in less than an hour. A frame building housing a chip conveyor belt was destroyed. Dust from shavings in an elevator shaft was believed to have ignited by spontaneous combustion, burning the shaft and spreading to the rest of the building. No figures on the damage have been released.

Damage Estimated at $15,000
resulted from a two-alarm fire which swept Co-operative Box & Crating Co. in Minneapolis November 25.

4,000 Tons of Paper,
including some newsprint, were destroyed November 18 in a fire at a waterfront warehouse in Alexandria, Va. Estimated loss was $400,000.

$35,000 Damage was Caused
November 21 in a fire which gutted the second floor of Central Ohio Paper Co., Cleveland. Two persons were injured while fighting the blaze.

Paper, Paper Supplies
and burlap were burned November 16 in a fire at Portland Provision Co., Portland, Ore. Damage was estimated at at least $10,000.

One Man was Killed
and seven others injured recently in an explosion and flash fire at the Weyerhaeuser Timber Co. plant in Longview, Wash. Four of those involved in the accident were mill workers, while four were employees of a construction firm that is building an addition to the pulp division of Weyerhaeuser. The explosion took place in the kraft liquor recovery boiler on the third level of the seven-level building.

Large Quantities of Baled Paper
stored in a strikebound Whippany Paperboard Co. mill at Whippany, N.J., were destroyed by fire November 30. The firm, which has been struck since August, drew national attention when maintenance workers were flown over picket lines by helicopter. The strike, principally over wages, was called by the CIO United Paper Workers of America.

Union Bag & Paper Corp.
has announced that the railroads have authorized its 4/5 bushel grapefruit bag as an acceptable container. Acceptance follows the success of commercial test shipments. The bag is made from three layers of wet strength paper.

St. Regis Paper Co.'s
pulp dock at Waddington, N.Y., closed for the 1951 season after unloading the Mead Cliffe Hall. During the year there were 49 shiploads of pulpwood delivered, comprising 56,817 cords, as compared to 1950, when 47,268 cords were delivered by 41 ships. Most of the wood was loaded at Godbout, Que.

Forest Land Management
was one of the subjects discussed at a farm forestry short course held at Abraham Baldwin Agricultural College in Tifton, Ga., December 4. T. M. Cordell, dean of the college, was in charge of the program. Among the speakers was Earl Porter, chief forester for International Paper Co., Mobile, Ala. Sessions were held on naval stores and saw timber. Demonstrations on planting pine trees were staged on a farm near Tifton, with Hugh Allen of Camilla, district forester, and Vernon Yow, forester at the college, in charge.

Central Fibre Products Co.,
Quincy, Ill., has announced that the city council has approved its plan for solving the fly ash problem. Following lengthy study of the problem attributed to the smokestack of the paper mill, the firm has ordered equipment for one boiler. If the test is successful, similar equipment will be installed. The equipment is guaranteed to reduce the stack discharge of fly ash so as to meet the requirements of the St. Louis smoke regulation.

Timberland Sales and Leases
are reported at a rapid rate in Clinch County, Ga. West Virginia Pulp & Paper Co. has leased 2,600 acres from H. Wylder Williams Sr. The lease is scheduled to run for three years at a price of approximately $80,000. The agreement is for pine timber, with no real estate involved. In other leases and sales, Dr. Paul Kirkland of Manchester bought 630 acres from the Parley P. White estate. Two hundred acres of the estate of the late James B. Hodges brought $35,000, while 17,000 acres have been sold by W. B. and Charles Gillican of Brunswick at $50 per acre.

Macon Kraft Co.,
Macon, Ga., was host to 13 journalism students from the Atlanta branch of the University of Georgia recently. The students toured the paper mill and forest area, tracing the production of paper from seedling trees to finished product. Demonstrations included forest fire-fighting, tree-planting, and an explanation of the differences between the newsprint and kraft processes.

Paper Cups and Containers
are being collected in a giant stockpile near Batavia, N.Y., for use in the event of an atomic attack in the central or western parts of the state. One million cups and containers is the goal.

Gardner Board & Carton Co.
has recently installed 20 reading racks at its plants in Middletown and Lockland, Ohio. Magazines, pamphlets and reprints of articles are kept in the racks. Material is selected from 500 leading publications and gathered by a national organization specializing in the field. The racks are refilled three times a month.

Nekoosa-Edwards Paper Co.,
Port Edwards, Wis., staged its 19th annual sales conference December 4 through 6 at the firm's home offices. The program included a tour of both mills, a detailed review of the company's expansion program, and discussions of 1952 sales and advertising programs.

Kimberly-Clark Corp.
recently honored long-service employees at the annual dinner of the Quarter Century Club, which was held in the community school at Niagara, Wis. More than 300 persons attended the gathering, which featured the admission of 27 employees to membership in the club. Included was the Niagara mill manager, R. J. Wells. Principal speaker was W. H. Clifford, vice president in charge of finances, who discussed the Kimberly-Clark pension plan.

A Building Boom
in preparation for an influx of workers is developing in Ketchikan, Alaska. Industrial activity is high since the announcement that Puget Sound Pulp & Timber Co., Seattle, plans to build a pulp mill in the city. Preliminary engineering work on the mill is progressing, and plant and water supply sites are

being made ready for actual mill and dam construction.

Christmas Gifts Totaling $12,750
were distributed to local institutions in Port Edwards, Wis., by the Nepco Foundation, established in 1947 by Nekoosa-Edwards Paper Co. This brings to $25,055 the total of gifts and grants contributed by the Foundation during the year.

Officials of the *Trenton* (N. J.) *Times*
were introduced to Manistique, Mich., businessmen at a luncheon recently on the occasion of the announcement of Trenton Times Corp's. purchase of the Mead Corp. mill.

Ottawa River Paper Co.,
Toledo, Ohio, recently suffered damage estimated at $4,500 in a fire which swept two truck trailers and the company loading dock. The trailers were loaded with corrugated paper.

17 CIO United Paper Workers
went on trial at Newark, N.J., recently on charges of violating an order against mass picketing at the strikebound Whippany Paperboard Co. They were also charged with interfering with maintenance and supervisory personnel who entered the firm's three plants. Whippany workers left their jobs four months ago to support demands for substantial pay increases.

Hollingsworth & Whitney Co.,
Mobile, Ala., has received a wage adjustment from WSB's regional office. The increase is 3 cents an hour, retroactive to June 1, for 116 non-union employees.

10-Cent Per Hour Wage Increases
have been granted to foremen and factory workers at Columbus Paper Box Co., Cleveland, by the regional WSB office. An increase of 8.7 cents an hour was granted truck drivers. The new rates became effective October 31.

Hooker to Build $10,000,000 Chlorine and Caustic Plant

Hooker Electrochemical Co., Niagara Falls, N.Y., plans to build a $10,000,000 plant for the manufacture of chlorine and caustic soda at Montague, Mich. The facility is expected to be in operation by the end of 1953, with a yearly production rate of approximately 100,000 tons of all products.

Design of the plant is to be in charge of Hooker's engineering department. Total area, including a brine field, comprises over 400 acres. The Hooker-type S-3A cell will be used to convert salt brine into chlorine, caustic soda, and hydrogen. Natural gas discovered during exploratory drilling for salt wells indicates the possibility of sufficient gas to meet the fuel requirements of the plant.

Monsanto (Canada) Ltd.
has announced plans to construct a plant at Ville La Salle, Que., at an approximate cost of $400,000. Designed as a research laboratory and pilot plant, the project will more than double the firm's present facilities.

American Air Filter Co., Inc.,
Louisville, Ky., has announced that American Air Filter of Canada Ltd., Montreal, is handling its Canadian business. William G. Hole, formerly of Darling Bros. Ltd., is in charge of all operations. Representatives in the larger cities are to handle the AAF line of air filters, electronic precipitators, and Roto-Clone dust collectors.

Morden Machines Co.,
Portland, Ore., has announced the appointment of Orton Corp., Fitchburg, Mass., as eastern sales representative for the Morden Slush-Maker and Stock-Maker.

Armstrong Cork Co.,
Lancaster, Pa., has established a separate felt and fibrous products department of the Industrial Division. D. P. Paiste, formerly manager of Armstrong's Industrial Division district office at Boston, has been named manager of the new department.

Minneapolis-Honeywell Regulator Co.
has opened a new district office at Harrisburg, Pa. William J. Brosch and Jack Caylor will handle sales for the firm's Brown Instrument Division. John Hopkins will handle commercial and Donald Schmick heating controls divisions sales.

Arvey Corp.
will double the output of its chlorine and caustic soda plant in Memphis. The estimated cost will be $2,000,000. Engineering and construction contracts have been awarded to H. K. Ferguson Co., Cleveland.

Babcock & Wilcox Tube Co.,
Beaver Falls, Pa., a wholly owned subsidiary of Babcock & Wilcox Co., was to be dissolved, effective at the close of business December 31. The tube firm's business and assets were absorbed by, and it will be operated as, one of the divisions of the parent company.

Sterling Electric Motors, Inc.,
Los Angeles, has announced appointment of the following additional distributors to handle the firm's power drives: Allied Bearings Supply Co., Tulsa; Berry Electric Co., Walla Walla, Wash.; Alabama Bearings Co., Montgomery; Stanley Electric Motor Co., Stockton, Cal., and Roy A. Berentz Co. Inc., Houston.

Albany Felt Co.,
Albany, N.Y., has purchased all equipment and supplies for producing paper machine felts owned by Kieckhefer Container Co., Delair, N.J. The amount of the cash transaction was not disclosed.

Colt's Mfg. Co.,
Hartford, Conn., gun manufacturer, has obtained the manufacturing, sales, and patent rights for the production of machinery for making corrugated boxes. The new manufacturing development in the packaging industry, the "Rite-Size" box machine, was purchased from Jacob Industries, Buffalo, N.Y.

E. I. duPont de Nemours & Co.,
Wilmington, Del., and Glidden Co. were acquitted by a jury in federal district court in Pittsburgh December 4 of charges of violating the Sherman anti-trust laws. The decision ended litigation started in July 1948, when the Justice Department obtained indictments against DuPont, Glidden and 12 other paint companies and 21 of their officials charging conspiracy to fix paint prices, discounts, and allowances.

Lyon Metal Products, Inc.,
Aurora, Ill., recently honored more than 100 employees who have 25 years' service with the firm. Thirteen employees who have completed 25 years of service during 1951 were inducted into the Quarter Century Club, while an additional 26 were cited for 35 years' or more service.

H. K. Ferguson Co.
Cleveland, has recently been awarded two contracts for major industrial expansion. The firm will construct a new heating plant to serve National Tube Co.'s Fairless Works, Morrisville, Pa. The installation will consist of two boilers, each with a capacity of 85,000 pounds of steam per hour. The Ferguson Co. will also build a $1,000,000 alloy plant for Tenn-Tex Alloy & Chemical Corp. at Houston, Tex.

General Electric Co.,
Schenectady, N.Y., has recently released a sound film, "Pipeline to the Clouds," pointing out the growing threat of water shortages in the United States. The aim of the film, which is available to communities and organizations, is to enlist support behind water conservation.

Westinghouse Electric Corp.
Pittsburgh, will undertake a $296,000,000 expansion program extending be-

We can help on those –

PAPERMAKING PROBLEMS...

Bagley and Sewall's constant research and development, not only in theory but in the direct application of newly designed machinery to papermaking problems has resulted in the most practical and economical machinery designs for present day competitive paper mill operation...We invite paper mill inquires to our engineering staff for information and survey applications of the latest Bagley & Sewall papermaking machinery developments for either mill modernization or expansion programs.

designers and builders of papermaking machinery since 1853

WATERTOWN • NEW YORK

500 FIFTH AVENUE • NEW YORK 18, NEW YORK

Finland Representative
Aktiebolaget Ekstroms Maskinaffar
Helsingfors, Finland

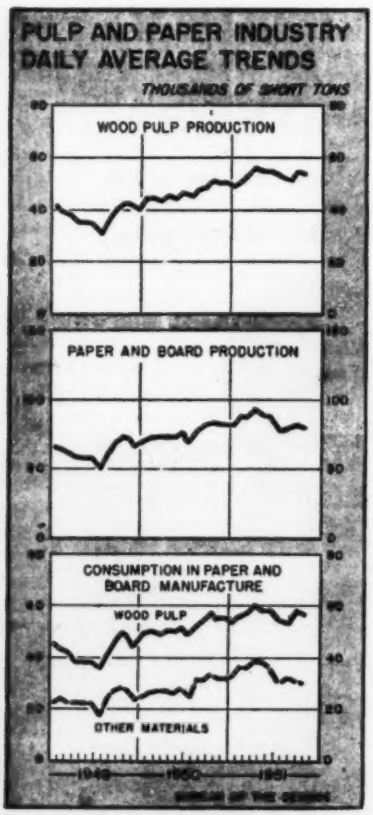
Foreign Representative
Castle and Overton, Inc.
630 Fifth Ave., Rockefeller Center, New York 20, N.Y.

yond 1953. Major projects included in the program are an electronics plant at Raritan Township, N.J.; a small motor plant at Union City, Ind.; electronic tube plants at Elmira and Bath, N.Y.; an aircraft armament plant at Baltimore; a jet engine parts plant at Columbus, Ohio; a generator plant at East Pittsburgh; five new lamp plants, and the purchase of a plastics plant at Hampton, S.C.

Bulkley, Dunton Pulp Co., Inc., has moved its Newark, N. J., offices to larger quarters at 461 Central Ave. Greater space and improved facilities will enable the firm to further its services to customers in that area. Bulkley, Dunton recently expanded its warehouse, office and service facilities in New Haven, Conn.

October Pulp, Paper and Board Production

Paper and board production during October amounted to 2,218,299 tons, according to figures released by the Bureau of the Census, U.S. Department of Commerce. This is only slightly less than the 2,235,060 tons produced in October a year ago. In terms of production base capacity, the industry operated at 78.5 per cent in October, with the paper and paperboard sections operating at 88.9 and 70.1 per cent, respectively. The comparable ratios for September were: Total, 81.3 per cent; paper, 91.6 per cent, and paperboard, 73.6 per cent.



U. S. Paper and Paperboard Production

	Oct. 1951 (tons)	Sept. 1951 (tons)	Oct. 1950 (tons)	Total 1950 (1,000 tons)	Total 1945 (1,000 tons)
Paper and Board, total	2,218,299	2,018,385	2,235,060	24,300	17,371
Paper, total	1,043,653	939,441	954,751	10,679	7,574
Newsprint	97,614	87,622	88,346	1,017	725
Groundwood paper (uncoated)	74,173	67,967	64,993	694	636
Printing and converting (coated)	96,131	88,645	87,254	1,015	1,501*
Book paper (uncoated)	142,787	130,222	143,186	1,577	
Fine paper (writing, cover and text, bristols, thin paper and other)	123,279	110,546	112,243	1,223	1,001
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment and other)	324,326	296,567	293,548	3,383	2,403
Special industrial paper	38,749	32,496	25,888	316	238
Sanitary paper	114,936	96,587	105,525	1,108	824
Tissue paper	21,578	19,383	23,238	241	157
Absorbent paper	10,080	9,406	10,530	105	89
Paperboard, total	928,055	862,865	1,012,441†	10,804	7,907
Containerboard, total	513,604	469,688	524,938	5,646	4,131
Liners	347,869	313,978	343,679	3,690	
Corrugating material	145,261	136,475	152,807	1,637	
Container chip	20,474	19,235	28,452	320	
Bending board (folding boxboard)	260,049	243,291	(1)	2,368	2,092
Nonbending board (set-up boxboard)	63,046	62,125	(1)	641	721
Cardboard	6,744	6,804	6,967	77	71
All other paperboard	84,612	80,957	183,979[2]	2,071	891
Wet machine board	11,329	10,185	14,013	144	112
Construction paper and board, total	235,262	205,894	253,855	2,673	1,778
Building paper and insulation	120,586	103,257	132,914	1,414	883
Hardboard and insulating board	114,676	102,637	120,941	1,259	895

(*) Total for 1945, combining printing and converting paper and book paper. (†) Data for "Other bending board," "Other nonbending board," and "Special paperboard stock" are not available separately. The total for these grades for October 1950 is 183,979 tons. This figure is included in the "Paperboard" total. (1) Data not available due to revision of classifications. (2) Figure includes "Other bending board" and "Other nonbending board."
Source: U. S. Department of Commerce.

Pulpwood receipts at the mills during the month were 2,513,804 cords. Consumption at 2,364,568 cords was less than receipts, resulting in a 3 per cent month-end inventory increase to 5,129,790 cords.

Wood pulp production during October amounted to 1,461,938 tons. In terms of production base capacity, pulp production ran at 86.6 per cent as compared to 89.7 per cent for September.

Wood pulp inventories at the end of October at paper and board mills were 489,651 tons as compared to 496,564 tons reported at the end of September. Month-end stocks at pulp mills decreased about 2 per cent to 102,382 tons.

Georgia Leads in Southern Pulpwood Production

For the third consecutive year, Georgia has topped all other southern states in the production of pulpwood. The total output in 1950 was 2,221,000 standard cords. That figure, an all-time Georgia high, was announced in early December following an extensive survey by the Southern and Southeastern Forest Experiment Stations and by the Southern Pulpwood Conservation Association.

The survey showed that Georgia's production was 11 per cent of the nation's total pulpwood output, while amounting to 18 per cent of the total cut of the South. Bryan was the leading county, with an output of 80,063 cords. Camden County produced 77,964 cords, and Effingham County 71,407 cords.

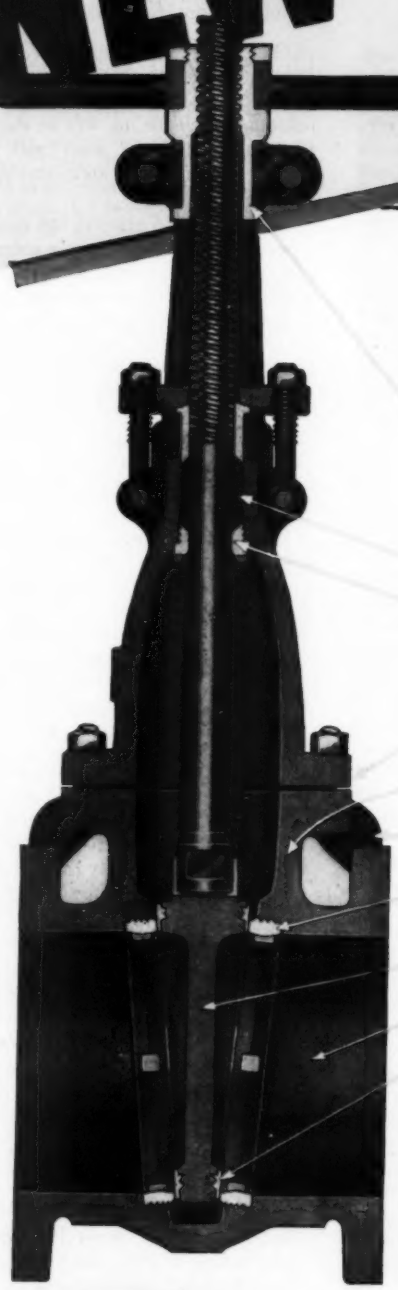
The state's total production of softwood for 1950 in the pulpwood field was 2,120,738 cords, while hardwood production, exclusive of chestnut tree output, was 88,847 cords. Pulp from chestnut trees accounted for 11,694 cords. Runner-up to Georgia in pulpwood production in the South was Mississippi, with 1,665,000 cords, with Florida following at 1,385,000 cords.

Pulpwood production in the entire South rose in 1950 to an all-time high of 12,435,700 cords. The region produced 60 per cent of all the pulpwood cut in the nation during that year.

NEW

IRON VALVES that give you Steel Valve Features

OIC
FOUNDED 1883



NOW the workhorse of the family—OIC's iron valve—offers you features formerly found only in steel valves. It's a brand new valve built around more than a third of a century's experience in making iron valves. We kept only the old handwheel.

Examine these construction details:

1 Lubricated yoke bushing, renewable without removing bonnet.

2 Deeper stuffing box; longer packing life.

3 Inserted back seat bushing permits repacking under full pressure.

4 Stronger body-bonnet joint; uniform gasket compression.

5 Better metal distribution, reduced weight, increased strength.

6 Sturdy tie-ribs; added resistance to pipeline stresses.

7 End-seated bronze seat rings will not loosen in service.

8 I-Beam type solid wedge, accurately guided.

9 Straight-through port areas reduce flow resistance.

10 Rolled-in seat facings on wedges give longer life.

OIC's new line of Iron Valves gives you longer service, lower upkeep and greater security. For Bulletin 805 telling you all about them, call your local OIC distributor or write The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1883

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

How to use algin for surface sizing and surface control

The second of two articles describing the major applications and processes for using algin in the manufacture of paper

V. V. VALLANDIGHAM, A. L. MAGNUSON and A. MILLER
Technical Dept., Kelco Co.

MOST EFFECTIVE and economical way of controlling the surface qualities of a sheet of paper or paperboard is by application of special sizings to the surface by means of (1) calender stack water boxes or (2) size presses.

Paper can be manufactured without the use of these types of units to give any desired degree of oil or water resistance, however, it is generally too costly to do so. The use of either the calender stack or size press for the application of surface sizing gives a greater degree of flexibility and permits greater tolerance in the paper or paperboard to be sized. In addition the cost of such treatment is much less than the special preparation of pulp to obtain the desired characteristics.

Two types of surface sizing

Surface sizings fall into two major classes: (1) Saturating type—such as the starches and other low viscosity materials which bring about the desired results by filling the air spaces in the sheet. Sizing with this type material is generally costly because of the high consumption of size due to saturation. This method, however, can be used to increase the Mullen and pick tests and to increase the internal density of the sheet. (2) Filming type—highly polymerized materials such as algin which are selected specifically for their film-forming characteristics. This type increases the surface density thus controlling the absorption of printing ink, waxes, oils, varnish and similar materials. Consumption of this type of sizing is lower and efficiency is greater than the saturating type.

It is frequently desirable to make combinations of these two sizing types to develop characteristics of both. A film-forming type of sizing such as algin may be added to allow viscosity starch in high concentration and the film former will contribute filming properties to the low viscosity saturating type of sizing. This allows the use of relatively concentrated sizing solutions to produce films of extremely high density. This type of sizing is applicable for the production of waxing sheets such as bread wrap, milk bottles, and butter carton stock, carbonizing tissues, and wax laminations. This method may also be used as a pre-size for stock to be clay coated.

Use of algin

Algin has attained acceptance as a surface control sizing in the paper industry because of its characteristics in producing special effects on the sheet's surface, its uniformity, and ease of use. The range of viscosity types permits effective usage in the specialized sizing application previously mentioned. Algin is readily adaptable to water box applications as it is soluble in either hot or cold water, does not cause foaming, picking, sticking of the sheet to the calender rolls, or filming of the calender rolls. As the algin film lies almost entirely on the surface, curling is reduced and in some cases eliminated. These characteristics allow for a uniform application of the film upon the sheet's surface.

Algin helps lay down the surface fibers of the sheet and as a result the surface is smoother and the gloss is increased. Different types of algin are available to produce the desired type of surface sizing under the various production and equipment conditions. Effective control of printability is obtained by the application of one pound of algin to approximately 20,000-60,000 square feet. The mileage depends mainly upon the freeness and texture of the paper surface.

In recent years a satisfactory method has been developed for the rapid evaluation of the resistance of paper or paperboard surfaces to mineral oils*. This has been found to correlate well with actual printing or waxing results and is based on the change of gloss with time, of a uniform oil smear spread upon the paper surface. Typical curves are shown in Fig. 1.

Printing surfaces

In the printing of half tones the surface of the sheet should have a uniform ink acceptance without too high a resistance which will cause the ink to smear and run on the surface blocking off sections of the half tone screen, and yielding a job unacceptable because of lack of distinct lines. If the surface of the sheet is so porous that it exhibits no resistance, then the ink will be absorbed too readily and the sheet will show through on shadowed areas and appear faded.

For high grade printing the desirable type of sheet should have a controlled rate of ink absorption to give good clean highlights, half tones and good intense shadows. By proper application of the surface sizing it is possible to develop the desired degree of resistance to obtain these characteristics. Algin is particularly suitable for this job because in forming the film on the surface it does not saturate the sheet's surface to the extent of blocking off complete ink absorption or acceptance.

For the production of gloss ink board it is necessary to produce an ink resistance sufficient to effectively control ink penetration. This enables the varnish to set in a continuous film across the sheet surface and develop good gloss characteristics. This resistance must also be controlled so as to permit a certain amount of ink absorption which accelerates the drying thereby preventing offsetting. For example, a sheet having 100 per cent ink resistance would permit the ink to dry or set only on the surface and the ink in contact with the sheet's surface would remain tacky for a prolonged time, seriously impairing the high speed printing.

It is possible to properly surface treat a sheet to develop the degree of resistance necessary to permit both half tone and gloss ink printing on the same sheet. Obviously this calls for good control over the type and concentration of the sizing applied. This type of printed carton is being successfully produced. Figure 2 shows a characteristic curve illustrating the proper degree of oil resistance necessary for this type of sheet.

Selection of the proper type of sizing material is only one of the important

---

* "The Effective Evaluation of Paper Surfaces for Printability." V. V. Vallandigham. *Paper Ind. & Paper World*, Nov. (1945). pp 1258-1264.
"Forecasting Printability by Oil Absorption Measurements." V. V. Vallandigham. *Paper Trade J.* 123, No. 17, 209-11 (1946).
T.A.P.P.I. Routine Control Methods, #RC-81; April 1950.
"Correlation of the Board Committee Test for Surface Oil Resistance of Paperboard with the Results of Gloss Ink Printing." S. M. Chapman. *Pulp Paper Mag. Can.* 50, No. 3, 201-3 (1949).

steps in the production of the desired surface resistance. Proper handling of the size solution and the proper sizing formula to be used on the paper machine are also of extreme import as improper handling of the sizing will usually produce inferior results or increased sizing costs.

Variables affecting size application

This selection of the sizing material and formulation is governed for the most part by the speed of the machine, caliper of the sheet, water box flow characteristics, and solution temperature as applied. These factors are more important in calender sizing than when the sizing is applied at the size press where the flow is considerably greater. The position on the calender stack also has considerable bearing on the resulting temperature.

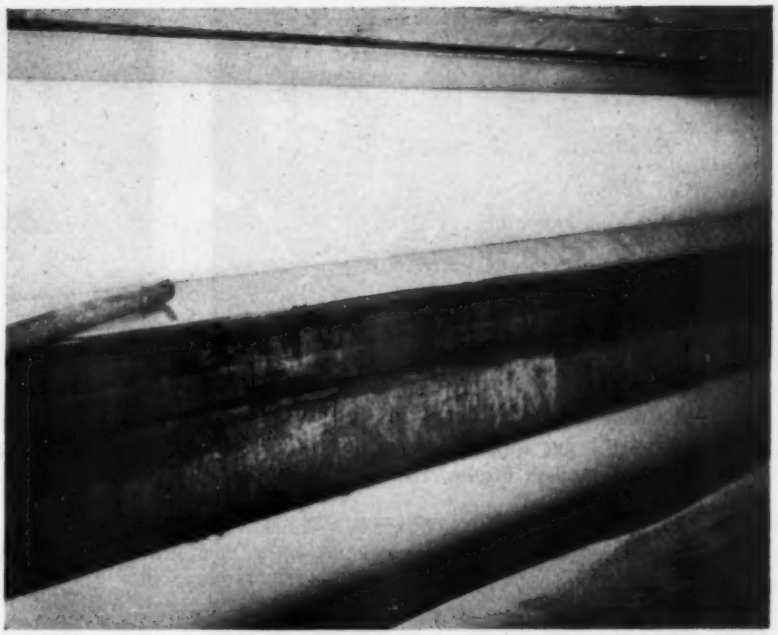
Most calender sizings are applied on the wet stack and at a point as close to the top as is convenient. The sheet is well above 200 F. at this point, and this temperature is transferred to the sizing solution at the point of application. For best sizing results the temperature of the solution should be maintained below 140 F. At higher temperatures of say 180-190 F. the air in the sheet is squeezed out under the pressure of the nip at the critical instant that sizing is being applied. This forces the sizing off the sheet's surface. Furthermore air squeezed out of the sheet is forced into the solution producing foam and making production of a good film practically impossible.

On the other hand, if the temperature of the size solution is between 120-140 F, the temperature differentiail is sufficient to contract the hot air in the sheet preventing the nip pressure form forcing it into the size solution. This slight degree of contraction sucks the sizing solution onto the sheet's surface, and a good surface film results. This sizing solution will then run free of air bubbles, and any foaming tendency is minimiized.

Low solution temperatures

Maintenance of low solution temperatures in the water boxes also reduces possibility of film formation on calender rolls. It must be remembered that the sizing is selected because its desirable film forming properties produce effective surface resistance. If the solution runs hot as a result of the stack temperature, the calender rolls are hot, and all the conditions necessary for rapid film formation are present.

In the calender sizing operation all of the solution carried into the nip is not applied to the sheet's surface. A large percentage is forced from the nip and flows back down the roll into the box while a small fraction is carried around on the calender roll and returns to the box. Under high solution and roll temperatures this minute film of calender solution will dry during the revolution of the roll from the time it leaves the sheet until it returns to the box to pick up more solution to carry up to the sheet surface.



Water box application of a one per cent solution of low viscosity algin (Kelgin LV) to 16 pt. white patent coated board; printability numbers were in the order of 70 to 80 (Courtesy Fleming & Sons, Inc., Dallas)

However, by maintenance of low temperatures this film will not dry during this short interval, and filming of the calender rolls will be eliminated. The most successful sizing operations utilize the circulation of large volumes of sizing through boxes having outlets and return piping of such size that full flow can be conveniently handled. It is preferable to have several inlets and at least two points of outflow across the box.

The pH of the sizing solution is also of prime importance. Most sheets contain a quantity of free alum which during the drying operation will migrate to the sheet's surface. This alum readily dissolves in the sizing solution causing a resultant pH and viscosity change. To eliminate changes of this type it is a usual practice to include a small amount of a polyphosphate with the algin in the sizing solution. Problems of temperature and pH control are not as critical on the size press although it is important to maintain a uniform temperature of the sizing across the sheet to produce uniform results.

Due to various types of furnishes and prepartions some sheets have a natural tendency to pick. All sizing solutions are not capable of overcoming this picking tendency and are occasionally blamed for the picking condition on the calender stacks. To correct this condition effectively changes in preparation and furnish should be made, but sometimes it is possible by treating the calender solution to reduce or eliminate the attraction of the surface fibres for the steel calender rolls. This is done by incorporating an adhesive material into the film forming type of sizing to saturate the surface and bind the fibres to the base sheet. Although this method is effective in overcoming the trouble, it is strongly recommended that the cause be corrected by proper sheet formation.

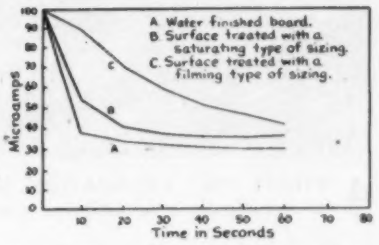

A. Water finished board.
B. Surface treated with a saturating type of sizing.
C. Surface treated with a filming type of sizing.
Microamps
Time in Seconds

Fig. 1—Gloss variation indicates resistance of coating to oil penetration

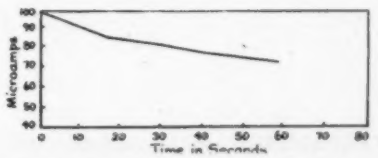
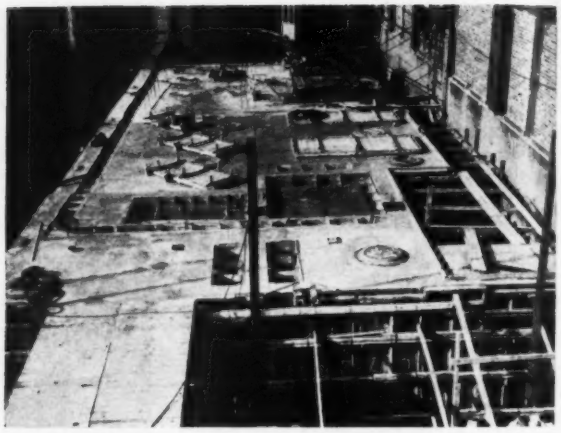


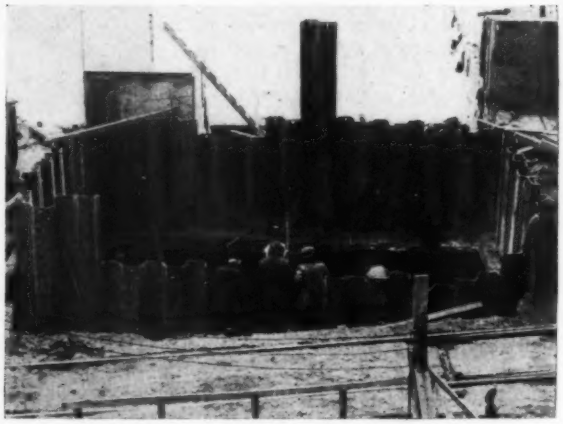
Fig. 2—Oil resistance characteristics of a coated sheet for both halftone and gloss printing

1 PUMPHOUSE EXCAVATION, August 23, 1950, as water came through fissures, complicating the work



2 PUMPHOUSE SUBSTRUCTURE, October 11, 1950, with the concrete base for the pumping equipment

4 INTAKE WELL EXCAVATION, December 13, 1950, as complications necessitated change in site



5 DRIVING SHEET PILING, December 20, 1950, with most intake well work being done in winter

Abitibi's Thunder Bay Mill

EXPANDING beyond available water supplies, Abitibi Power & Paper Co. Ltd's. Thunder Bay mill in Ontario installed its own water system to insure adequate supplies over dry spells and periods of heavy water demand. Previously, this necessary pulp ingredient had been obtained from the City of Port Arthur's pump well through the company's own pumping equipment. The best supply available was 8,000,000 US gallons in 24 hours, and when the demand was excessive, water levels in the well would drop, cutting the mill's intake by 50 per cent. This cut mill production by a similar degree.

With mill expansion in view, it became necessary to insure the water supply, and a decision was made to install a self-contained water system at the mill. Over six months ago this system was put into operation, and subsequent trials have proven it to be satisfactory.

C. D. Howe and Co. of Port Arthur was asked to prepare plans, and this firm became coordinator in charge of equipment installations and construction. John Bourke, resident engineer, and W. G. Reekie, chief engineer at Thunder Bay, worked with this firm on behalf of Thunder Bay, and the final plans, once approved, were contracted to Claydon Construction Co., a local firm.

The contract was let on June 5, 1950, and the construction work finished by February 26, 1951. After nearly nine months of performance, the installations have proven satisfactory.

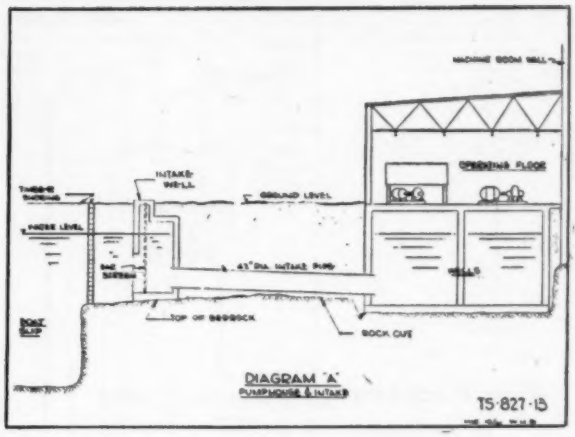
However, all was not milk and honey for the contractors, who ran into trouble during the excavation and took three months to complete the job instead of the one month anticipated. As shown in Diagram A, the pumphouse area had eight feet of earth over a shaley lower iron formation bedrock. Excavation of the earth went rapidly, but as blasting of the rock took place, water gushed up through the cracks and fissures in the rock, making extra pumping necessary.

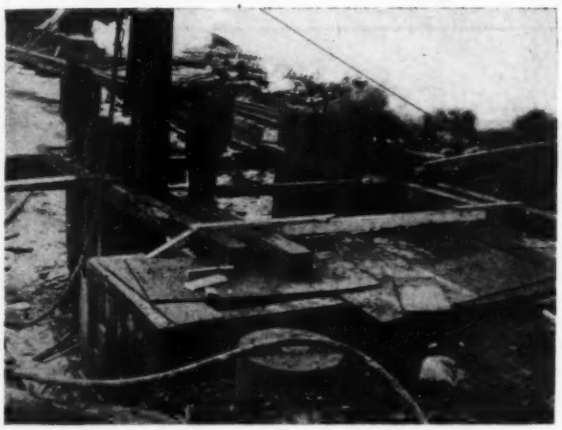
Construction details

Fissured rock hampered the drilling and blasting, and all the time a pumping capacity of about 4,000 gallons per minute had to be maintained.

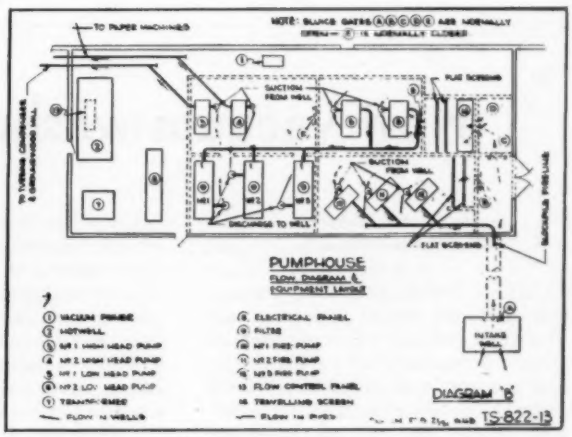
Once the pumphouse mat was poured in early September, construction work went forward with less difficulty. Figs. 1, 2 and 3 show stages of the work as it

3 INSTALLED EQUIPMENT, March 5, 1951, when pumphouse installations were completed





6 WELL INTAKE, February 22, 1951, as sheet piling is driven for intake approach beside dock slip



Installs New Water System

progressed on the pumphouse section of the project.

The intake well also presented problems of construction. Originally, the design called for the intake to be located directly beside the timber shoring of the slip, but for over a month unsuccessful attempts were made to put down this excavation (Fig. 4). Finally, timberwork extending back from the shoring of the dock face prevented the driving of part of the sheet piling. It was finally decided to move the intake well location in from the dock to clear all the timberwork, as the inflow of water became so great that pumping was hopeless.

Once sheet piling was driven around the new area, the excavation was completed without any further serious trouble, although the retarded schedule put the work into the winter months. Work progressed slowly through the frozen ground, and most of the intake well was pushed ahead under adverse weather conditions (Figs. 5 and 6).

Meanwhile, work on the pumphouse went forward and was completed to coincide with completion of the intake well. On February 26 the project was ready for its first service tests.

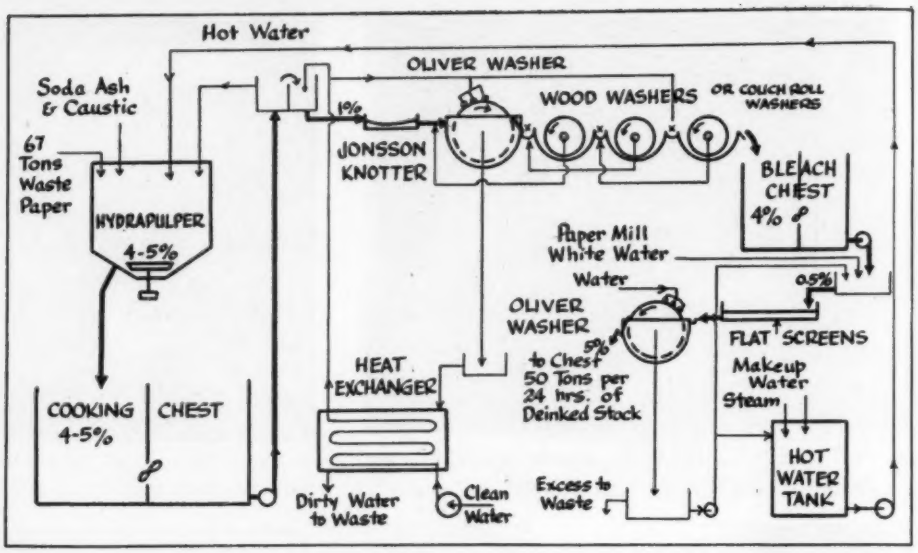
Diagram B shows the floor plan of the pumphouse. The water passes from the intake beside the boat slip through a 42-inch diameter pipe to the pumphouse. Here it passes through a ¼" wire-mesh travelling screen and through a battery of ¼" and ½" wire mesh flat screens into the low head pump suction well. From here two low head pumps with a total capacity of 12,000 USGPM pump the water through three filters having a total capacity of 15,000 USGPM.

Water is then passed through an 80-mesh wire screen to be discharged to the filtered water well below.

Passing through the wall openings of the filtered water well, the water enters the adjacent high-head pump well and is drawn up by the high-head pumps designed for a capacity of 8,000 USGPM.

This water is pumped to the mill under a head of 165 feet by one 3,000 USG pump for the paper machine and one 5,000 USG pump for the rest of the plant.

A float-controlled valve in the low-head pump discharge line to the filters automatically controls the water level in the filtered water well and the high-head pump well.



Flow diagrams of deinking systems show

How vacuum washers improve efficiency of

H. A. MORRISON
Oliver United Filters, Inc.

PRESENT SHORT SUPPLY and current high prices of new pulps have stimulated and extended the development of plants for reworking old papers. At this time average book paper stock carries about 25 per cent groundwood. In addition, modern color printing and decorative advertising has introduced many obstacles to production of bright pulp of satisfactory strength from this source.

Current trends in deinking of old papers involve preliminary cooking in caustic or in a mixture of caustic and solozone (sodium peroxide) with supplementary refining to condition the stock for ink removal and bleaching. Vacuum washers are used at several points in the modern system. They remove carbon, fillers, and water soluble impurities with reduced shrinkage of valuable fibres, and minimize volume of rejected waste. The waste insoluble materials are dewatered by vacuum filters after thickening in settling tanks. Valuable cooking reagents are so recovered with incidental economy of heat unts.

Sodium peroxide (solozone) and hydrogen peroxide have much merit as an aid to better brightness when groundwood is present. Chlorination followed by caustic extraction and final hypochlorite bleaching has produced large tonnages of deinked pulp at above 75 brightness (GE). This cycle of treatment largely converts the included groundwood to a chemical type pulp. Shrinkage is of course greater than when 100 per cent chemical type old papers are treated.

The initial step of preparing the stock for ink removal is increasingly one in which cooking is supplemented by mechanical treatment. Continuous or batch cooking with caustic alone, or in conjunction with solozone, is followed by treatment in some type of refiner or pulper. After the printing oil has been saponified in cooking, the fibre bundles can be mechanically separated with only nominal reduction in freeness or fibre length.

After the above double treatment, ink removal is comparatively easy and thorough, as the carbon no longer adheres to the fibres. It is a problem of removing the carbon and clay with minimum incidental loss of the valuable fibres, and may be classed as a screening or classification step.

Vacuum Washer Operation

A vacuum filter preceded by a Vortrap or Dirtec installation and followed by a second vacuum washer or by two conventional type couch roll washers in series will insure well cleaned pulp. All effluent from the deinking washing plant must leave direct from the vacuum type washer. The latter can be so operated that comparatively little fibre is lost. The effluent carries 15-20 lb. insolubles per 1,000 gallons. The rejected solids on book papers are about 60 per cent ash content.

For best results in this ink removal step, the following conditions require close control. The vacuum washer conditions must be—

1. Feed temperature not less than 150 F.
2. Feed consistency not over 0.75 per cent a.d.
3. Washer cylinder at 3-4 rpm.
4. Washer cylinder cover 30x30 mesh wire cloth.

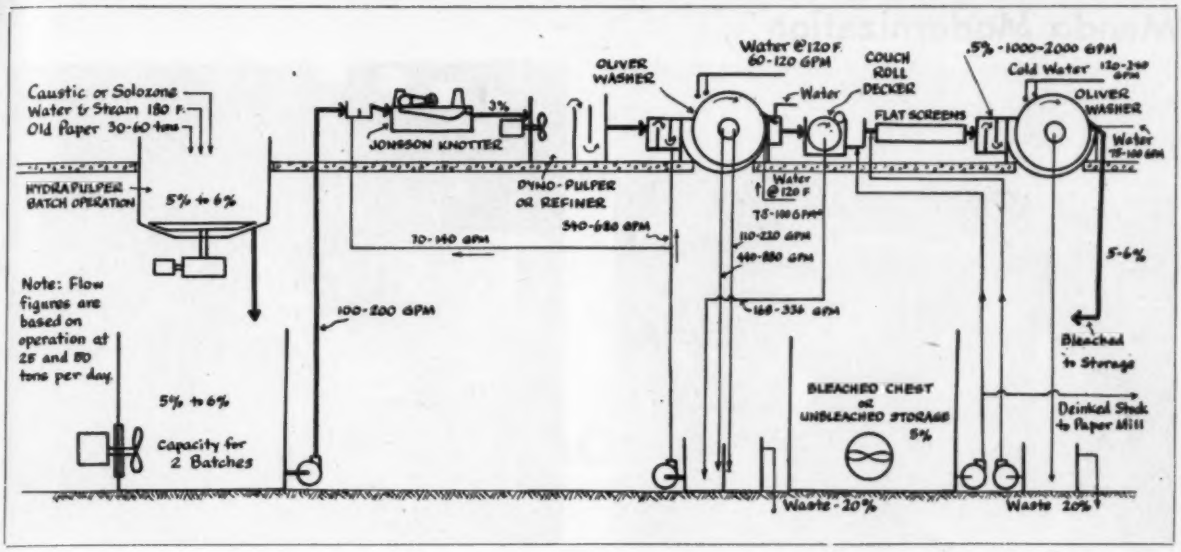
After deinking and before passing into the multi-stage purification and bleaching system, old magazine stock should contain not more than 3 per cent inorganic solids and be entirely free from any inclusions of large dark colored material. If the work of defibering and ink removal has been well done, the stock brightness at this point will be about 50 (GE).

Simple hypochlorite treatment alone will bring this stock up to about 60 brightness without excessive shrinkage. Ample time, at least three hours, in contact with the weak bleach liquor, is essential. Such stock is not suitable for use in white papers, but does serve very well as a filler in colored sheets where opacity is important. It is used in certain napkin and towelling grades mixed with unbleached sulphite or kraft.

Multi-stage Bleaching

To produce fine white stock many mills are now following conventional multi-stage bleaching practice, consisting of chlorination and caustic extraction before final hypochlorite bleaching. Sodium rather than calcium bleach is preferred, especially when the process water is hard. With soda bleach the reaction products are more readily dissolved and removed by the wash water.

A vacuum washer follows each stage in the process of purification and bleaching. These washers function for removal



deinking and bleaching operations

of water soluble reaction products. They wash by displacement, not by dilution, and require comparatively little water to accomplish their purpose. When operated as a bleach washer after flat screens fibre loss from vacuum washer does not exceed 0.50 lb. per 1,000 gal., and no serious loss results from sending the whole filtrate to waste.

Some mills send excess paper machine white water to the head box of their flat screens on bleached old paper stock. This practice has the advantage of reducing mill shrinkage since the vacuum bleach washer then operates as a saveall incidental to its basic duties of removing the water soluble products of final bleaching and of thickening the stock for slush storage. Such return of paper mill white water may slightly reduce final brightness of the pulp.

Process Variations

When a central deinking system serves several different paper machines or more than one paper mill, the final bleach washer may be equipped with press rolls to produce a continuous sheet at 25-30 per cent a.d. consistency. The pulp may then be stored in lap or sheet form or shipped to the desired point of use. For this purpose the vacuum washer cylinder is usually of cast iron construction and rubber covered press rolls with annular grooves are employed.

The quality and value of deinked old paper pulp is primarily determined by the kind or kinds of stock sent to the deinking system. Final strength of deinked ledger is naturally greater than that of book papers. Ledger contains much less ink and is free from groundwood. However, it often carries considerable filler material and is more highly sized as compared to magazine stock.

The trend is away from hand sorting because of excessive labor costs. The modern deinking plants depend upon a combination of chemical and mechanical treatment to develop the desired strength and brightness.

Some mills utilize their multi-stage bleaching systems to treat and finally bleach their output of sulphite or kraft pulp along with the production of old paper stock. This works out well in a sytem where chlorination, caustic extraction and hypochlorite steps are employed. Another type system involves initial treatment with solozone with a final hypochlorite step. The latter may be followed by an acid treatment followed by washing on a rubber protected vacuum washer.

When long fibre stock, such as new kraft or sulphite is present as a major component of the stream of old paper stock, each piece of equipment, including the vacuum washers, operates more efficiently, and at a greater rate of production, due to increased freeness of feed and greater permeability of the sheet. The sheets on the washers are better formed and wash water more readily. Thus, more efficient washing, with reduction of wash water, is commonly realized.

The flow diagrams presented with this article show considerable variety. This is not at all surprising, since no standard deinking system has come into general use. Too often the system is determined by the equipment actually on hand at the mill. In these days of high cost raw material, either new pulp or old papers, it would be most profitable to use the equipment that is best suited to each process step.

Cost of Deinking

The costs for deinking of old papers may be classified under labor, chemicals, heat, power, and maintenance of equipment. The cooking step is usually conducted in a breaker beater or Hydrapulper, with consistency in the pulper or beater at 4-5 per cent and temperature about 165 F. Steam for heating the necessary 480 gallons of water from a normal 60 up to 165 F. is a major cost item. In a plant producing 90-100 tons of pulp daily, the steam economy resulting from the use of heat recovery equipment on this waste effluent from this initial vacuum washer, may represent as much as 480,000 lb. per day. Some mills practice partial direct reuse of this ink removal effluent for cooking their stock. This method saves chemicals and heat units. It is established that partial reuse of the hot effluent in cooking has no adverse effect upon final stock brightness.

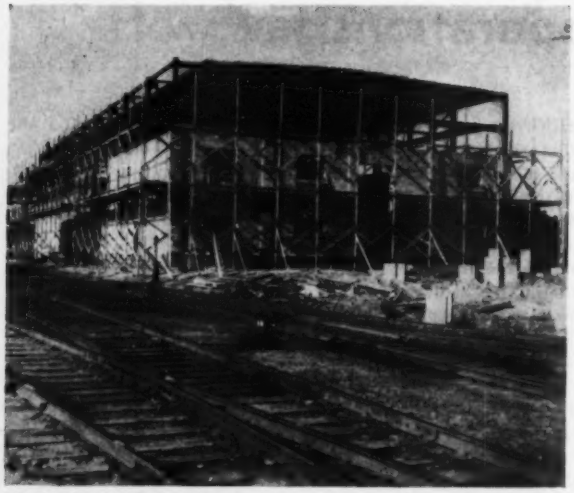
It is increasingly evident that deinked old papers of acceptable brightness can be produced without excessive loss of valuable fibre. Vacuum washers retain most of the fibre and reject the carbon, off color fillers, and dissolved impurities.

Further information on this subject may be found in "Deinking of Printed Papers, A Symposium," THE PAPER INDUSTRY AND PAPER WORLD, June, 1949, pages 329-342.

Mando Modernization

INTERNATIONAL FALLS—New Koppers electrostatic precipitator and . . . .

Beloit-built Mando coater



FORT FRANCES—New wood room under construction and . . . .

No. 5 paper machine being rebuilt

KENORA—New Foster-Wheeler lignite stoker and . . . .

Nuveyor lignite ash disposal system

Mills at International Falls, Fort Frances, Kenora—

all share in progress as

Mando Modernizes

MODERNIZATION at the Minnesota and Ontario Paper Co., now representing well over $17,000,000 in expenditures, moved further ahead this year in many important phases.

This program, dating back to 1945, is designed to provide greater product diversification, improved efficiency of operations and resultant increases in production volume. With the addition of new bleaching facilities, Mando can now produce eight different types of pulp, permitting the manufacture of many grades not heretofore possible.

Major 1950-1951 improvements:

1. Placing in operation of a Mando-designed coating machine at International Falls.
2. Construction of a groundwood bleachery at International Falls.
3. Installation of a new sulphite screening system at International Falls.
4. Electrostatic precipitator and coal bunker and handling facilities at the International Falls plant.
5. Replacement of Briner economizers on three paper machines at International Falls.
6. Construction of a new wood room at Fort Frances.
7. Modernization of No. 5 paper machine at Fort Frances.
8. Conversion of boiler facilities to lignite operations at Kenora.
9. Replacement of the screen system on two paper machines at Kenora.
10. New broke Beater at Kenora.

Previous major installations primarily at the firm's main operation at International Falls, Minn., included: construction of a 15-million gallon water filtration system, a 200-ton a day sulphate and sulphite bleach plant, a forest products research laboratory, modernization of paper machines and rehabilitation of pulping facilities, and modernization of Insulite plant including installation of a fourth Insulite machine.

Mando coater

During the past year, at International Falls, a new Mando coater was placed in production. This machine was designed and developed by the Mando research department and built by the Beloit Iron Works.

It is of the reverse roll type set up as an off-the-machine coater. It is patented in the United States and abroad by Mando. The coater follows a Kohler unwind reel and flying paster which takes a full reel from one of our paper machines. Following the coater is a drying section and a standard Pope type reel, from which the coated stock is transferred to an unwind stand; from there it goes to the supercalenders. The coater is driven by multimotor DC drive and can be operated at speeds upwards of 1,000 fpm. The machine can take up to 142 inch sheets from Mando's No. 2 paper machine.

Groundwood bleaching

Another important improvement at International Falls is the installation of a groundwood bleachery. The new bleachery, completed in November, can handle 75 tons of groundwood pulp a day. It is installed in the same building that holds the 200-ton kraft and sulphite bleaching equipment, completed in early 1949. The groundwood bleachery is designed for either sodium peroxide or hydrogen peroxide methods. The tank has a 45 foot diameter and is 45 feet high. Groundwood pulp for bleaching is supplied by Mando's Fort Frances mill.

With the new facilities for manufacturing bleached groundwood pulp, Mando enjoys greater pulp diversification than most mills in North America. Besides bleached groundwood, Mando makes unbleached groundwood, unbleached and bleached soft wood sulphite, bleached hard wood sulphite, and unbleached, semibleached, and bleached sulphate.

New screens for International Falls

Essential to this program was improvement of the screening system. Outmoded knotters and rotary screens were replaced by 24 flat screens, of the latest design. These improvements in the sulphite system, completed last October, proved to be more efficient, required less maintenance and consumed less power in relation to their output capacity, which is 168 tons in 24 hours.

The layout consists of 12 lines of 14-plate screens, two for each line. They are fed from a cypress flow box that has hand-operated gates that control flow to each line of screens. Stock from the reject screens is made into insulation board. The stock and water flow through stainless steel pipes. Other improvements are three Jonsson vibrating type knotters, tiled stock storage chest, an agitator in the chest and two vacuum filters, replacing pneumatic deckers.

The filters and the flat screens were manufactured by the Improved Paper Machinery Corp. Mando engineers and operators designed the screen system and Mando maintenance crews installed the new equipment.

Coal storage and handling

To provide adequate storage for coal, a 294-foot-long by 19-foot-wide by 63-foot-high coal storage and handling structure was built last year, with a capacity of 2,200 tons. The coal bunker and handling system delivers coal to the steam plant from railroad cars without the help of manual labor. The interior of the bunker is lined with a two-inch coat of "gunite" that keeps the coal's corrosive action away from the sides of the bunker.

One of the most modern of coal handling systems, this is the way it works:

From a track hopper, the coal is moved on an apron feeder into a crusher, having a capacity of 150 tons an hour. Next, the crushed coal moves through a tunnel under the tracks to two bucket elevators. From the top of the elevators, the coal is hauled by belt through a traveling tripper that dumps the coal into storage bins at any desired point. The coal is taken to the boilers in lorries suspended on rails, running the full length of a bunker. The coal is moved in the lorries to pulverizer hoppers before it is fed into the boilers. The coal is fed into the lorries from 45 bunker gates, placed about six feet apart.

Koppers precipitator

A recent survey, conducted by an Eastern opinion research firm, showed that the residents of Internatiaonal Falls complained about the salt cake dust in the air from the firm's kraft mill. To improve community relations, an electrostatic precipitator was installed. The precipitator removed about 95 per cent of the dust from the air. It also saved Mando valuable raw material. The unit was purchased from the Koppers Company, Inc., and was installed by the maintenance crew at the International Falls plant.

Three new unit-type load center substations were installed last year at International Falls, marking another important modernization step. These substations, 2,000 kva. and 1,500 kva., were designed to supply light to the mills and to supply power to the paper mill machinery. These sub-stations were an addition to the already existing Mando-owned electrical distribution system.

In the Mando Canadian Division, the Ontario-Minnesota Pulp and Paper Co., Ltd., modernization and expansion of plant facilities is moving along at a rapid rate.

New Wood Room at Fort Frances

Two important steps in the program were started this year at the 300-ton paper mill at Fort Frances, Ontario. These included construction of a new wood room and modernization of Mando's second paper machine, No. 5.

The modern wood room replaced the old wood room that has been used since the mill was built in 1914. Four large drum barkers, 12 ft. by 45 ft., employee lunch room, and locker room were housed in the building. The four new barkers replaced six old, 10-ft. by 30-ft. barkers. The building was located so that pulp wood can be taken from the Rainy River at a much more favorable location. A new 360-ft. conveyor belt was installed to modernize the transfer of pulp wood from trucks and rail cars. Bark removal was implemented by a gravity flow system, that takes it to the present bark press room which, in time, will be modernized.

Paper machines rebuilt

Improvements on the No. 5 machine increased the speed of manufacture by 400 fpm. The production range was set at 200 fpm. to 1,200 fpm. as compared with 800 fpm. on the old machine before improvements. In 1949, No. 6 machine at Fort Frances was modernized in much the same way No. 5 was last year.

Both machines were almost completely rebuilt. The rebuilding process included: Six new drives, removable fourdrinier section, new suction press, Harland sectional electric drive, minor adjustment to the calender stack, new water-cooled Pope type reel and a new Cameron winder with regenerative electric drive. In addition, new broke beaters were installed earlier, plus improvements in the screen room.

Kenora power plant converts to lignite

Mando's extensive modernization program reached its plant at Kenora, Ontario, in the form of power plant improvements such as lignite operation, ash handling system, as well as other plant changes.

Last November, the installation of a Foster Wheeler spreader-type stoker in the No. 2 boiler unit was complete. This was the fourth and final unit converted in the Kenora steam plant. The conversion resulted in considerable savings through the use of lignite and by the efficient operation of the new stokers. To make room for the new stokers, under-feed brick stokers, dating back to 1925, were torn out. Because the new stokers have no moving parts, maintenance costs were kept low. Water-cooled walls prevented damage to the stokers from overheating and provided a new source of steam.

Conversion to lignite created new ash handling problems. These were licked by the installation of Nuveyor pneumatic ash and fly-ash conveyors with a rotary dustless loader. When coal was used, the ash was soaked with water, but because of the light lignite ash, wetting tended to pack the ash in its bunker.

Now, the lignite ash and fly-ash moves through two lines to the bunker and is unloaded by the dustless loader into rail cars.

Another major improvement at the Kenora mill was the installation of a set of Bird screens on the plant's No. 9 machine. When the machine was built, it was equipped with five type 2 Bird screens. By 1950, the five original screens were replaced one at a time so that No. 9 machine was in operation during the three month installation time. This fall, paper machine No. 8 was equipped with new Bird screens. The new screens increased the production of newsprint at the Kenora mill, and increased efficiency more than justifies the cost of installation.

The new broke beater was put into operation at the Kenora paper machine in March of 1950. It featured a continuous extraction, triple flow, but was so designed that it could be batch dumped if necessary. It was set up on the dry end of No. 8 paper machine.

At Fort Frances, a new color room was built in May of 1950. Because of the color room, Fort Frances paper makers improved the quality of their groundwood specialty papers.

FM network connects widespread woods operations

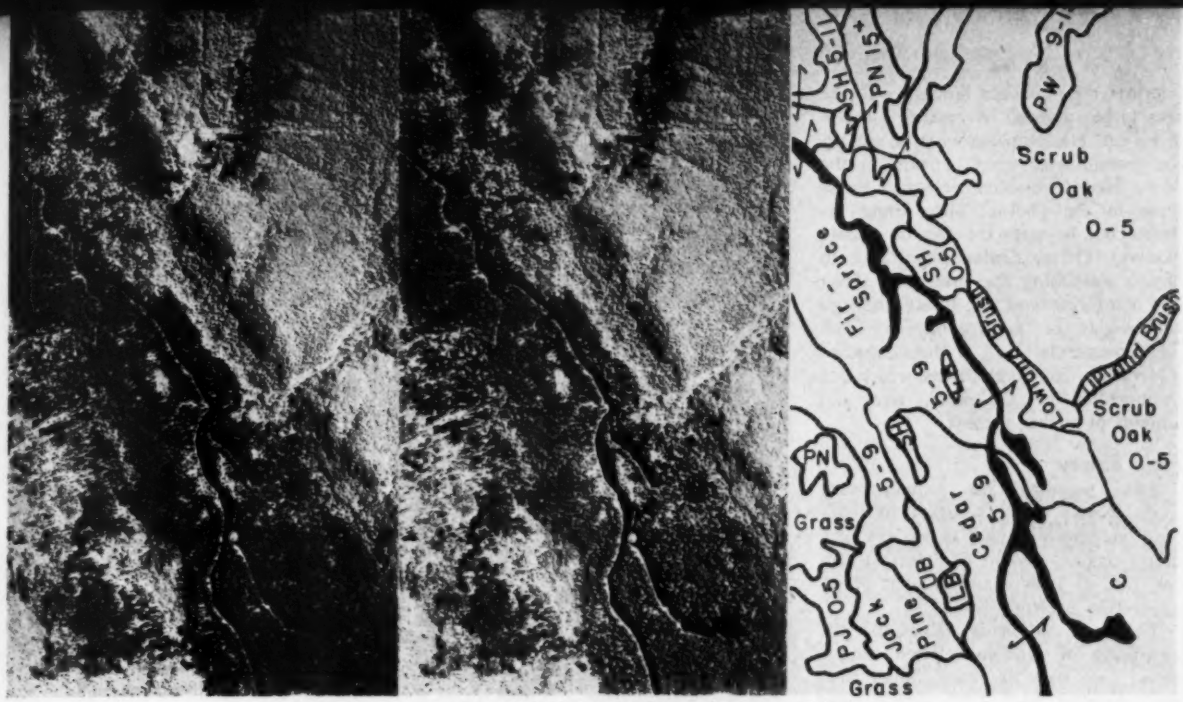
Further extensions were made to the FM radio network. This project installed in the early stages of the improvement program has increased the efficiency of the logging operations. Two 250 watt stations keep the mills and camps in immediate contact. Radio communication is maintained over the vast regions of northern Minnesota and Ontario. Each camp is equipped with portable sending and receiving sets. The FM network is especially useful while the wood is being brought to the mills.

Besides aiding logging operations, the network has many public service uses. An example of the public service value of the network is the use of the radio facilities by Civil Defense organizations in the United States and Canada. Civil defense aircraft spotters, stationed in the bush, relay their information via radio to filter centers in Fort Frances, Ontario, and International Falls. From there the information goes on to Minneapolis, Minnesota. With the help of Mando's FM radio network, enemy planes can be reported long before they reach industrial concentrations in the Midwest.

Work in progress

Other important improvements under way at Mando mills at the present time are the placing of three Briner economizer systems for No. 2, 3 and 4 paper machines, an addition to the Insulite warehouse and a new storage and loading building for the stores department at the Falls mill. At the Kenora mill, six Warren grinders are being widened. A new Roberts ring-type pulp grinder is being installed at Kenora. A building over pulp storage tanks is being constructed at International Falls. Also, an extension of the Insulite trainshed is under construction. Remodeling of Insulite machine No. 2 is expected to be completed by the end of this year.

Mando's modernization program, resulting in increased production, is further evidence of the industry's all-out effort to meet the ever increasing demand for paper.



Vertical stereopair of a stretch of the Brule River, with a map of the area

FORESTERS measuring a permanent sample plot in Marathon county

PHOTO INTERPRETER mapping from aerial photographs

Measuring and mapping provides basis for . . .

Wisconsin's forest inventory

OF INTEREST to the paper mills of Wisconsin is the forest inventory now under way in 32 of the state's northern counties. The project is a joint undertaking with private industry, including the paper mills, counties and the U. S. Forest service taking part. Among the members of the steering committee set up by the Conservation commission to work out details of the inventory are: F. G. Kilp, chairman, Nekoosa-Edwards Paper Co.; Bruce Buell, Chief Forester, Northern Paper Mills; J. V. Martin, Rhinelander Paper Co.; J. Landino, Sterling Pulp and Paper Co.; and R. W. Lyons, Asst. Vice President, Kimberly-Clark Corp.

The purpose of the inventory is to determine (1) species and forest types of timber (2) volume and (3) rate of growth and where located. Given this data authorities may then answer the questions: Do some areas require more cutting because of a timber surplus? Are some areas being cut at too fast a rate? Do other areas need planting?

Making the survey

The survey consists of three phases: (1) aerial photography (2) sampling survey (3) intensive surveys. The value, of aerial photographic work lies in the results it obtains from extensive areas in a shorter time and less cost than ground cruising. However, ground work is still being done to gain information that cannot be obtained from photos.

Mapping the area

The aerial photos are studied by interpreters who make a type map or overlay of the area. This is done with the aid of a pocket stereoscope which adds a third dimension view and which allows easier recognition of hills, highway fills, etc. Infra-red film modified with a minus blue filter is preferred for this work because it makes for easier identification of species and forest type. Conifers and hardwoods show a marked contrast.

Before making the actual map, the

interpreter familiarizes himself with the area to be surveyed by making a cruise in his car. He compares what he sees on the ground with what appears on the photo. He is then able to recognize forest types in the photos. Then using his stereoscope he maps the area on acetate overlays. Of particular importance to him is classifying the cover into forest and non-forest land; the forest land into commercial or non-commercial land. The commercial land is then classified into various condition classes, which is a combination of the kind, size and amount of timber present.

Field Survey

After mapping, the ground work starts. Crews check accuracy of mapping, volume of timber in various condition classes, amount of defect in timber, rate of growth and amount of reproduction present.

This information is gained by the measuring of random selected sample plots. Two sizes are used. Small trees are measured on a 1/50 acre circular plot and larger trees on a 1/5 acre circular plot. Diameters and merchantable heights of the trees are measured. In this manner, the number of cords or board-feet can be estimated.

About 1/8 of the approximately 14,000 plots to be measured in the survey will be "permanent" plots which will be remeasured five to ten years from now. In this way, the present inventory will be brought up-to-date at that time.

Results of inventory study

Marinette county, the first county to conduct the survey, recently made some highly interesting results available. The survey showed a stand of 165,000 cords of mature aspen in the Marinette County Forest, and about 65,490 acres of reproduction and sapling aspen. Ten years hence there should be merchantable aspen on a good part of this stand; therefore, a 15,000 cord annual yield of aspen can be expected. In addition, county forester J. H. Seamann said that the survey showed that not enough aspen was being cut in the forest. The cut of aspen is to doubled this year on the strength of this inventory information and mobilization.

The steering committee expects the use of the findings of the forest inventory will take out guesswork about timber potentiality in Wisconsin. Chairman Kilp summarized the matter with the declaration:

"We have reached the point where it is high time that the forest industries be furnished with accurate, up-to-date inventory of the state's present timber resources and drain. These industries should be given such basic information pertaining to our state's timber resources that they will be in a position to plan for the future on a sound basis."

How to determine battery requirements for electric trucks

J. E. VAUGHAN

Gould-National Batteries, Inc.

DETERMINATION OF CAPACITY of storage batteries which provide power for electric industrial trucks is often left to the truck supplier, the battery representative, just plain guess, or duplication of present batteries. However, there is an engineering procedure, which, if followed, will enable the purchaser to correctly specify his own battery requirements or check suppliers' recommendations. In addition, these calculations will insure against purchasing under-capacity batteries which run down before the end of the shift, or conversely, over-capacity batteries calling for unwarranted initial cost.

To illustrate the procedure for determining industrial truck battery capacities we will assume a typical case—a 3,650 lb. truck, 2,000 lb. load, 3 ft. average lift, 110 ft. average haul and 30 ft. 10 per cent grade to be traversed by loaded trucks.

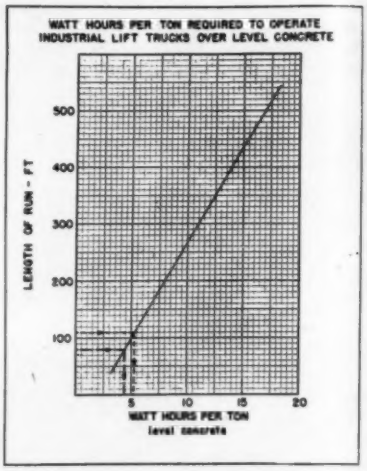
It will be necessary to determine the power (watt hours) required to traverse the average haul distance loaded, climb the grade, traverse the haul distance empty (grade deducted), lift the load for stacking, and tilt the mast for load-centering.

The graph shows the watt hours per ton required to move a truck along a given length of level run. We can use this graph to determine the power required to travel the average haul distance. By following the dotted lines we see that 5.4 watt hours are required to haul 1 ton along the 110 ft. haul of our example. Our total load is 3,650 lb. (truck) plus 2,000 lb. (load)—5,650 lb., or 2.825 tons. Multiplying 2.825 tons by 5.4 watt hours gives 15.25 watt hours required for the level run.

We can determine the watt hours required for going up grade (in addition to that required for level running) by using the formula: watt hours = tons (truck plus load) x ft. (length of grade) x grade (per cent) x .013 (a constant). 2.825 tons x 30 ft. x 10 x .013 = 11.02 watt hours (extra power for grade).

Then to calculate watt hours requirements for the empty return trip, deducting the grade, we have the 110 ft. total return distance less the 30 ft. of grade, or 80 ft. Again using the graph (dashed lines), we see that 4.4 watt hours are required per ton on the return trip. As the weight is now 1.825 tons, we multiply 4.4 watt hours by this figure getting 8.03 watt hours.

To determine the watt hours required for lifting, we use the following formula: watt hours per lift = tons of load x ft. of lift x 2 (a constant). Thus, 1 ton x 3 ft. x 2 = 6 watt hours required to lift the load. (For unstacking, the following formula applies: watt hours per lift empty = ⅓ load capacity in tons x ft. of lift x 2.)



Average power requirements for electric trucks are shown on this graph

To determine the energy required to tilt the mast, we use the following formula: watt hours per tilt loaded = tons of load x (a constant). Thus 1 ton x 1 = 1 watt hour per tilt loaded. (Watt hours per tilt empty = ⅓ load capacity x 1. Summing up we have the figures shown in the table.

Run with load, no grade, watt hr.	15.25
Extra power for grade	11.02
Run empty, grade deducted	8.03
Power required per lift	6.00
Power required per tilt	1.00
Total watt hr. per trip	41.30

Assuming 250 trips per day, a total of 10,325 watt hours of battery power are required. If we select a 32 volt battery, as recommended by truck manufacturers for this size truck, it must have approximately 323 ampere hour capacity. (Ampere hours equal watt hours divided by volts, hence the ampere hours required equals 7,597 watt hours divided by 32 volts or 237 ampere hours.) Battery manufacturers' catalogs give ampere hour capacities of various sized cells.

By following this procedure, the purchaser can effect economies which will be reflected in multiple since future purchases of batteries for given applications will be based on original computations.

Formulas used are from the *Handbook of Material Handling* published by the Electric Industrial Truck Association, 1950.

Sodium Chlorate . . . how to handle it safely

R. MATTAIR
Oldbury Electro-Chemical Co.

CHLORINE DIOXIDE for bleaching pulp has recently created some interest in the paper industry in the properties, hazards and methods of handling of sodium chlorate, one of the sources of the bleaching agent.

Hazards

In general, chlorates and perchlorates, because of their strong oxidizing properties, are potentially dangerous and must be handled with caution. Under the ICC Regulations, sodium chlorate is classed as an "oxidizing material" and is shipped under a yellow label. Shipment is authorized in either returnable or single-trip steel drums which may or may not have a paper-bag liner. Smaller amounts may be shipped in fiber or plywood boxes or drums with closed metal drums inside, or in wooden boxes with closed glass or metal containers inside. Sodium chlorate may also be shipped in tank cars, from which it may be unloaded as a slurry by recirculation of hot water between the car and the storage tank.

Properties

Sodium chlorate is a white, crystalline material, molecular weight 106.45, sp. gr. 2.490. It is somewhat hygroscopic and as the following table shows, is highly soluble in water:

Temperature	*0*	*25*	*30*	*50*	*70*	*90*
Density	1.400	1.440	1.450	1.490	1.540	1.580
Grams/liter of solution	655	720	745	888	935	1030

Alkaline chlorate solutions do not exhibit strong oxidizing properties. When concentrated they will react with reducing agents and oxidize organic matter, and the tendency to do so increases, of course, with the temperature, but, in general, alkaline solutions are comparatively inactive. As pH decreases, however, the oxidizing activity of chlorate solutions increases. Even dilute acid solutions are vigorous oxidizing agents as a result of the formation of chloric acid, a powerful, unstable oxidizing acid known only in solution. In the cold, solutions containing up to about 30 per cent $HClO_3$ are stable in the absence of organic matter and reducing agents. More concentrated solutions decompose spontaneously with the formation of chlorine, oxygen and perchloric acid. With appreciable amounts of organic matter of reducing agents, the recation may be violent, especially at elevated temperatures, unless the conditions are carefully controlled.

The melting point of sodium chlorate is 248°C. When heated in the pure state, it decomposes slowly with the evolution of oxygen and the formation of sodium chloride, beginning at about 350°C. The decomposition is exothermic and is self-sustaining above a critical temperature. In case of fire in an area where chlorates are stored, the large amounts of oxygen released can cause the combustion to be almost explosively rapid.

Many substances catalyze the termal decomposition and some form explosive mixtures with sodium chlorate. Such mixtures, particularly those involving organic materials, may be extremely sensitive to shock, friction or heat, and may even explode spontaneously in some instances. Contamination by such substances as ammonium compounds, cyanides, phosphorus, sulfur, acids or metallic oxides, or by organic materials or reducing agents of any sort, or by combinations of these substances, is to be avoided. Paper, wood, and leather impregnated with chlorate by contact with an aqueous solution are dangerously combustible when dry and may be ignited by friction or by heat.

Precautions in handling

Since there have been some fatalities due to ignorance or disregard of the hazards involved, personnel engaged in handling chlorates must be thoroughly indoctrinated in the necessary precautions. Clean work clothing must be worn each day and must be rinsed out in water each night. Clothing wet with chlorate solution should be changed immediately. No smoking should be permitted while wearing work clothes, and no open flames should be allowed in chlorate-handling areas. Deluge showers should be provided in such areas. It is good practice to have workers wear clothing of a distinctive color in order to indicate the possibility of having chlorate on their persons and to forbid them access to dangerous areas of the plant while wearing such clothing. Rubber footwear should be worn since rubber does not absorb chlorate and can be easily cleaned by rinsing.

Sodium chlorate is not toxic unless ingested in large amounts, nor does the dust constitute a health hazard, although scattered cases of skin irritation or ulceration of the nasal septum have been attributed to this compound.

Storage

Sodium chlorate should not be stored close to flammable materials, reducing agents, acids, or other hazardous substances. Preferably, a separate storage building should be provided. Storage buildings in working areas should be of fireproof construction, with cement floors, metal catwalks, and the like. Wooden construction is to be avoided because of the dangerous combustibility of chlorate-impregnated wood. If permissible under local statutes, sodium chlorate may be stored in bulk in concrete or steel bins and transferred thence to the point of use in covered metal containers. Galvanized iron barrels have been found suitable for this purpose.

The contents of damaged and leaking containers should be transferred immediately to sound containers because of the fire hazard involved. If spillage occurs, the greater part of the material should be picked up for reuse or disposal, depending upon the degree of contamination, and the rest washed to a drain using large amounts of water. In general, sodium chlorate may be disposed of by sewering a dilute aqueous

solution, or, if this is not allowable under local regulations, by burying in an isolated location to be leached slowly from the soil. In disposing of the containers, the paper liners, if any, should be burned and the drums washed with water before putting them to any other use. Chlorate-contaminated wooden boxes should be burned.

Ventilation must be provided for operations which give rise to appreciable quantities of fine sodium chlorate dust. The ventilation system should discharge to a water scrubber and should be designed for easy cleaning, preferably by rinsing with water. Frequent cleaning is advisable. Dust control is particularly important where motors are used, since mixtures of sodium chlorate with grease are violently explosive. Explosionproof motors are recommended, but motors with outside bearings may also be used if the bearings are frequently cleaned by overgreasing.

Corrosion Problems

Experience in the handling of hot neutral or alkaline sodium chlorate solutions has indicated that nickel and stainless steel, type 304 or 316, are very resistant to corrosion and are suitable for tanks, pumps and lines. Type 2S aluminum, used in pipe lines and in filter presses, is also quite satisfactory, although it is subject to electrolytic corrosion and must be protected with nonconductors such as rubber or Bakelite.

Ordinary steel or cast iron tanks are more subject to corrosion, particularly in the case of open tanks with fluctuating liquid levels, in the area of change in level. However, the life of such tanks is lengthened considerably by addition to the chlorate solution of 500 parts per million of sodium dichromate and 10 to 20 parts per million of sodium silicate. Steel tanks lined with silica-aggregate concrete have given long service, although some cracks do develop in the concrete. None of the rubber or plastic compositions tried have been considered satisfactory for tank linings, since all tend to become brittle or to be attacked. In addition, being organic, they introduce a fire hazard. Natural rubber, however, is satisfactory for gaskets in liquor lines.

Although sodium chlorate is dangerous, the hazards it presents can be overcome by rigorous observance of the necessary precautions.

References

Kirk and Othmer, The Encyclopedia of Chemical Technology, Volume III, Interscience, New York, New York, 1949.

Industrial Data Sheet D-Chem. 8. Reprints obtainable from the National Safety Council, 425 North Michigan Avenue, Chicago 11, Illinois.

Paper Mill Power—Part IX

Power supply—hydro, steam, or purchased

DAVID MOFFAT MYERS
Myers & Addington, New York

PAPER MILLS with an economical supply of water power of their own are in a fortunate position. When of sufficiently low cost and constancy of supply, it may substantially reduce the boiler pressures and capacity of steam turbines required for an efficiently balanced plant. Thus, capital cost and operating expense in the mill would be kept at minimum, although the total amount of steam required would be only slightly reduced. (See previous installments.)

The lower pressure of the steam in such a case might very considerably reduce the complication and cost of feedwater treatment for the boilers, especially if the raw water supply were high in silica, sulphates, and chlorides.

For correct evaluation, it is important to know the true cost of privately owned power, which involves all the usual charges for capital, maintenance, taxes, and operation.

In even a favorable case of owned water power, however, the question of paper mill drive would have to be determined by careful analysis. Direct-geared turbine drive does not require a high boiler pressure and the mechanical power thus derived is so cheap, owing to the complete use of the turbine exhaust, that even privately owned hydro-electric power would encounter difficult competition.

It goes without saying that unless the electric demand of the mill can always be satisfied by the available hydro power, it will become necessary to supplement it by means either of steam-electric generation in the mill or by purchase of power during periods of deficiency.

The capital and operating costs of such procedure must be added to the cost of the private supply of hydro power in order to know the cost of the firm power.

By so doing, it can then properly be compared to the cost of complete steam generation at the mill, after making due allowance, of course, for the large credit for process steam obtained from back pressure or extraction turbine-generators, as discussed in previous articles.

If the outside power source is a public utility, the principles of analysis involve the same general factors.

The criterion in all cases is, of course, the total combined annual cost of both steam and power services.

It would be fine indeed if owners could try one combination after the other, finally to adopt the plan of least cost. But that is too expensive a luxury, as attested by some owners who have tried it and made just one wrong guess, which they pay for at the expense of profits for many long years to come.

Fortunately, this costly "cut and try" method is quite unnecessary in the light of today's understanding of thermodynamics and power plant economics.

With proper analysis and knowledge of the whole range of possibilities, the right answer can always be determined before expending a dollar on equipment. This is true as well for existing as for projected plants, by virtue of thorough study in advance of action.

A sound system for a realistic survey is first to set up a plan of least capital expenditure which will provide the necessary steam and power facilities for present and projected production requirements. Determine the capital and operating costs of this program as a base.

Then similarly determine capital and operating costs for any other programs of modernization which show promise of substantial savings in annual costs.

Finally, a tabulation of these values compared to the base figures indicates the pay-off period for each plan and readily enables definite decision as to the most desirable recommendations.

The steam and power cost is an important percentage of the total cost of producing a ton of paper. Therefore, a thorough-going study of this type is always well justified.

Fiber studies contributing to the differential shrinkage of cellulose

GEO. J. RITTER
Chemist
R. L. MITCHELL
Chemist
Forest Products Laboratory,[1] Forest Service
U. S. Department of Agriculture

MICROSCOPICAL (7) and X-ray (3) data indicate that the predominant arrangement of the cellulose crystallites is approximately in the vertical crosswise direction of the ray cells, which is the longitudinal direction of the wood. This finding is at variance with the older concepts, according to which it was assumed that the cellulose crystallites are arranged with their long axes parallel to the lengthwise direction of the ray cells (4, 9, 12). According to microscopical and X-ray findings (3, 7), ray cells will shrink lengthwise, which is the radial direction of the wood. They will, accordingly, have exceedingly little, if any, restraining action on the radial shrinkage of wood.

The purpose of this article is to describe a composite microstructural crystallite arrangement of the fibers and the ray cells that will account for the fact that the radial shrinkage of wood is less than its tangential shrinkage.

The fundamental reason why green or swollen wood shrinks during drying is that water in the process of being removed from the noncrystalline zones between the submicroscopic cellulose crystallites draws the solid structural units together as a result of surface tension forces. Conversely, when dry wood is soaked, the water will enter the potential gaps between adjacent cellulose crystallites and amorphous particles and simultaneously push them apart a distance equivalent to the thickness of the water layer.

The principal movement of adjacent cellulose crystallites to and from one another in parallel arrangement during the adsorption of water is perpendicular to their long axes, whereas the movement of the amorphous particles tends to be random. In contrast, practically no movement occurs parallel to the long axis of the crystallites. The cellulose chains, which are substructures of the cellulose crystallites, extend through a number of different crystallites and thus connect them end to end, thereby tending to restrain endwise shrinkage. From the preceding discussion, it is apparent that the preferred directions in which wood or cellulose specimens will shrink or swell can be predicted if their crystallite arrangement has been determined.

Well-known experimental measurements show that normal wood shrinks most tangentially, less radially, and hardly at all longitudinally. These variations in dimensional changes which wood undergoes during the desorption of water below the fiber-saturation point are explainable on the basis of the arrangement of the cellulose crystallites in the walls of the fibers and the ray cells.

A few characteristic properties of wood and the slight effect they have on its differential shrinkage will be taken up briefly before discussing the major cellulose crystallite-arrangement phase of the subject. The parallel arrangement of the springwood to the summerwood tangentially in the annual rings has been proposed as a factor for producing greater tangential than radial shrinkage of wood. The springwood shrinks less than the more dense summerwood. Being attached to the summerwood, it restrains the summerwood from shrinking as much as it would if it were detached from the springwood. In contrast, the dense summerwood forces the springwood to shrink more than it would if it were detached from its two adjoining radial summerwood neighbors. The total average shrinkage of the two types of growth tends to be slightly greater in the attached condition than in the detached condition, as may be noted in columns 2 and 3 of Table 1.

In so far as the relative position of springwood and summerwood to one another is concerned, there should be no restraintive-augmentative radial shrinkage effects between the two growths. If the radial and the tangential fiber walls

Type of growth	Tangential shrinkage					Radial shrinkage of wood
	Attached	Detached	Ratio of attached to detached	Ratio of springwood to attached summerwood	Ratio of springwood to detached summerwood	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Percent	Percent	Percent	Percent	Percent	Percent
Springwood...	7.6	6.1	125.9	87.3	68.5	4.7
Summerwood...	8.7	8.9	97.7			
Springwood...	7.7	6.0	128.0	87.6	70.0	3.5
Summerwood...	8.8	8.9	97.6			
Springwood...	7.5	6.8	110.0	85.2	73.1	4.0
Summerwood...	8.8	9.3	94.6			
Springwood...	7.7	6.3	122.0	87.6	72.7	4.2
Summerwood...	8.8	8.8	100.0			
Springwood...	8.1	6.5	124.0	92.0	72.2	3.9
Summerwood...	8.8	9.0	97.7			
Springwood...	8.3	7.6	109.1	94.3	70.0	4.2
Summerwood...	8.8	10.9	80.7			

Table 1—Percentage shrinkage from water-soaked to oven-dry condition of longleaf pine springwood and summerwood cross sections when the two growths are attached and detached from one another

[1]Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

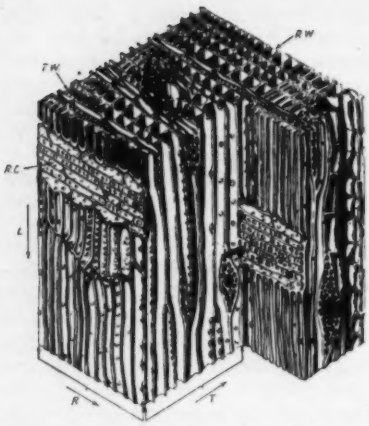


Figure 1—Diagram of a softwood. L, longitudinal direction; R, radial direction; T, tangential direction; TW, tangential wall; RW, radial wall; RC, ray cell

were the same microstructurally and were unrestrained by other factors, the radial shrinkage should approximate the tangential shrinkage when the springwood and summerwood are detached. A comparison of the average values in columns 3 and 7 of Table 1 shows no such approximation. Thus, it seems that the restraintive-augmentative action of springwood and summerwood on one another is only a minor contributing factor to the greater tangential than radial shrinkage of wood.

Attention should be called to a further effect of springwood and summerwood on the tangential shrinkage of wood. Since the shrinkage of springwood is less than that of the summerwood, it follows that a straight radial edge of a

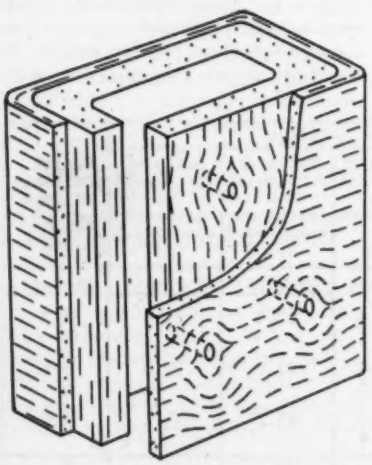


Figure 2—Diagrammatical sketch of the orientation of the cellulose crystallites in the fiber wall

cross section of green wood during drying becomes wavelike and the radial face becomes washboard in appearance. The crests of the waves indicate the location of the springwood bands, and the valleys between the crests, the summerwood bands. Thus, the over-all tangential shrinkage of the swollen wood specimens, as measured with ordinary calipers or gauges, is equivalent to the shinkage of the springwood on its own accord, plus that forced upon it by the summerwood. The shrinkage forced upon the springwood by the summerwood is manifested as a slight compression and is equivalent to the springwood shrinkage values in column 2 minus the corresponding values in column 3 of Table 1. As may be noted, the difference between the two corresponding values approximates 1.5 percent and is accounted for in the conventional methods of measuring the shrinkage of wood specimens of the dimensions employed in woodworking shops. Conversely, in measurements of swelling of dry, surfaced specimens, the dimensional change measured is that of the summerwood as modified by the restraint caused by the springwood.

Further, a difference in the fibril angle in the tangential wall of the fiber from that in the radial wall will cause differential shrinkage of wood. According to Frey-Wyssling (2), the angle between the fibrils in the tangential wall of the fiber and the long fiber axis is less than the corresponding angle in the radial wall of the fiber. Such a microstructural arrangement, during the removal of water from the lignin and the amorphous celluloses located between the fibrils, will

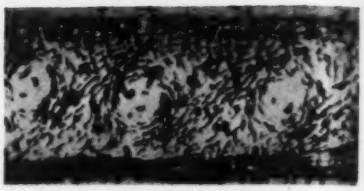


Figure 3—Photomicrograph of crystalline iodine deposited between fibrils shows the tendency of a circular structural arrangement of the fibrils around the pits *(Courtesy of Bailey and Vestal)*

produce greater tangential than radial shrinkage of the wood.

The arrangement of the cellulose crystallites may affect the shrinkage of wood in still another way. X-ray diffraction patterns of wood indicate that a considerable portion of randomly arranged crystalline and amorphous cellulose is dispersed among the regularly arranged crystalline zones. Directive forces that develop during drying tend to aline the randomly arranged cellulose particles parallel to the crystallites in the predominant crystalline zone. In this manner, directional shrinkage is augmented by the predominantly arranged cellulose.

It has been suggested that the cellulose may have preferred orientation in one of the transverse, as well as in the longitudinal, directions of wood fibers. As a result, less shrinkage would occur in one of the transverse directions than in the

Sample No.	Dimension (1)	Wet-wood dimension (2)	Dry-wood dimension (3)	Wet dimension minus dry dimension (4)	Radial shrinkage (5)
		Inches	Inches	Inches	Percent
1	Tangential	0.404	0.376	0.028	6.93
	Radial.....	.872	.842	.030	3.44
2	Tangential	.467	.434	.033	7.06
	Radial.....	.833	.804	.029	3.48
3	Tangential	.467	.434	.033	7.06
	Radial.....	.781	.750	.031	3.96
4	Tangential	.371	.342	.029	7.81
	Radial.....	.763	.739	.024	3.14
5	Tangential	.455	.424	.031	6.81
	Radial.....	.718	.688	.030	4.17
6	Tangential	.375	.348	.027	7.20
	Radial.....	.663	.641	.022	3.31
7	Tangential	.351	.326	.025	7.12
	Radial.....	.574	.556	.018	3.13
8	Tangential	.295	.273	.022	7.45
	Radial.....	.643	.622	.021	3.26
9	Tangential	.454	.422	.032	7.04
	Radial.....	.788	.755	.033	4.18
10	Tangential	.437	.402	.035	8.00
	Radial.....	.653	.620	.033	5.05

Table 2—Shrinkage from water-soaked to oven-dry condition of southern pine sapwood from which the wood rays were removed

other. This is improbable, however, since the water is sorbed in the amorphous zones and on the outer surfaces of the cellulose crystallites. The amorphous zones show only slightly preferred longitudinal orientation and probably no preferred transverse orientation. By themselves, therefore, they cause no preferred shrinkage. Most of the crystallites, which sorb water only on their outer surfaces, probably approach preferred longitudinal orientation and thereby produce mostly transverse shrinkage. In contrast there is no indication that preferred transverse orientation exists between adjacent crystallites. If preferred transverse orientation existed, the cellulose structure would tend to be one crystallite much larger than those postulated from present X-ray data. Thus, an explanation for the difference between longitudinal and transverse shrinkage cannot be extended to explain why there is less radial than tangential shrinkage of wood.

Effect of the predominant crystallite arrangement on shrinkage

The arrangement of cellulose crystallites in the fibers and the ray cells, which are the principal structural elements in wood, offers a fresh approach to this problem of shrinkage.

In the tangential walls of normal fibers (fig. 1) most of the cellulose crystallites are arranged with their long axes approximately parallel with the long axis of the fiber. These walls, therefore, shrink and swell both tangentially and radially.

In the radial walls of the fiber (fig. 1), two types of crystalline arrangement exist. One type occurs in the radial-wall segments located outside the periphery of a concentric-ring structure that surrounds the pit orifice. In this type the crystallites are arranged in normal fibers approximately parallel to the long axis of the fiber, as are those in the tangential walls. This arrangement causes maximum tangential and radial shrinkage and swelling. The other type of crystallite arrangement in the radial wall of the fibers is, in general, in the form of a concentric-ring area extending around the individual pit opening. Both the vertical and the radial diameters of the rings lie in a plane approximately parallel to the face of the radial fiber wall. In this type of arrangement the crystallites are oriented with their long axes approximately parallel to the perimeter of the ringlike area and also parallel to the face of the radial fiber wall. The ring is rather broad, extending somewhat beyond the outer extremity of the pit, and its depth is equal to the fiber-wall thickness. This crystallite arrangement produces maximum shrinking and swelling in the tangential direction of the radial walls. On the other hand, it will minimize the radial shrinking and swelling on account of its tendency to produce some longitudinal shrinking and swelling of the radial walls. The crystallite arrangement (Figs. 2 and 3) in the fibers, as a whole, is then such as to produce maximum tangential but minimized radial shrinking and swelling of the wood.

The cellulose crystallites in the ray cells (Fig. 1) also affect the directional shrinking and swelling of wood. Microscopical and X-ray studies (3, 7) indicate that most of the crystallites are arranged with their longitudinal axes in the general vertical crosswise direction of the ray cells, which is the longitudinal direction of the wood. The remaining crystallites around the ray-cell pits are arranged in concentric ringlike areas resembling those around the fiber pits. It is thus obvious that the ray-cell crystallites produce maximum tangential shrinkage, minimized radial shrinkage, and only little longitudinal shrinkage of the wood. The dimensional shrinkage produced by the ray cells is thus similar to that effected by the fiber crystallites.

Figure 4—Photomicrograph of tangential sections from pine sapwood block from which the ray cells have been removed

Accordingly, the fact that the random crystallite arrangement in the radial walls is greater than that in the tangential walls of the wood fibers, plus the fact that the vertical crosswise crystallite arrangement in the ray cells reduces radial shrinkage somewhat, results in less radial than tangential shrinkage of wood.

Experimental data have been collected that show close approximation between the radial shrinkage of ray cells and fibers. Slender, thin radial wood sections consisting of ray cells on one face and fibers on the opposite face were cut from green wood by means of a microtome. When dried in air that circulated freely over both faces, some of the sections dried straight, some bowed slightly toward the ray-cell face, and some bowed slightly toward the fiber face, just as do sections consisting of fibers on both the faces. These results indicate that the radial shrinkage of ray cells approximates that of the wood fibers. This arrangement of the crystallites in the ray cells is substantiated by the relative rates at which heat is conducted through wood. Heat is conducted most rapidly through wood in the longitudinal direction, which is parallel to the long axis of the crystallites in the fibers. MacLean (5) has demonstrated that heat travels 2¼ to 2¾ times faster longitudinally than transversely in wood and at approximately the same rate radially and tangentially. Rowley (8) found that the heat was transferred at slightly slower speed radially than tangentially. These results indicate a crosswise rather than a lengthwise arrangement of the crystallites in the ray cells; otherwise the heat should have been transferred faster in the radial direction.

Vertical crosswise orientation of the crystallites in the ray cells is further confirmed by results of shrinkage tests on ray cells. Microscopical measurements showed that the lengthwise shrinkage of isolated delignified ray cells closely approximates the radial shrinkage of the wood from which they are isolated. From these data, by themselves, it may be argued that although the ray cells have no restraining action on the radial shrinkage of wood normally obtained, they might, however, prevent further radial shrinkage to approximately tangential shrinkage values. Results to refute such an argument have been collected.

It was experimentally shown that ray cells have no restraining effect on the radial shrinkage of wood. Micromeasurements were made on the tangential and radial shrinkage of small sapwood pine blocks from which the ray cells had been removed by special degradative action, as may be seen in figure 4, which is a photograph of a tangential section from a block. The shrinkage values are recorded in Table 2. An analysis of the results in column 5 of the table shows that the low radial shrinkage values are comparable with those of woods in which the ray cells are present.

From the foregoing data and discussions, it appears that ray cells may be omitted from among the various factors that cause less radial than tangential shrinkage of wood. It also seems warranted to state that the old explanation in which ray cells are credited with no longitudinal shrinkage and thereby restrain radial shrinkage of wood is in gross error.

Diagrammatical examples of shrinkage

Three examples follow to show that the extent of shrinkage manifested by wood differs considerably, according to the specific gravity of the material.

Before citing the examples, it seems desirable to mention a few relationships between oven-dry and swollen wood. Oven-dry wood, on becoming fiber-

saturated, is known to adsorb moisture equal to approximately 30.0 percent of its weight. One cubic centimeter of oven-dry wood substance weighs approximately 1.5 grams. It will, therefore, adsorb 0.45 gram ($1.5 \times 0.30 = 0.45$) of moisture up to fiber saturation. The volume of the completely swollen wood, on the basis that the adsorbed water has a specific gravity of unity, discounting a 10 percent moisture-compression factor, is accordingly 1.45 times that of the oven-dry wood substance. Conversely, the volume of the oven-dry wood substance is approximately 0.69 per cent ($1 \div 1.45 = 0.69$) of that of the swollen wood substance. Accordingly, 1 cubic centimeter of wood above the fiber-saturation point will shrink 0.31 cubic centimeter ($1 - 0.69 = 0.31$).

Specimen A of figure 5 represents an enlarged cross section of a hypothetical 2- by 2-centimeter lumen-free wood fiber. The specimen is assumed to be in its completely swollen condition with 30.0 per cent of adsorbed water on the basis of its oven-dry weight. It has a cross-sectional area of 4 square centimeters. The specimen will shrink 1.24 square centimeters ($4 \times 0.31 = 1.24$) in cross-sectional area. It thus has an oven-dry cross-sectional area of 2.76 square centimeters ($4 - 1.24 = 2.76$), as shown in specimen A. All the shrinkage occurs externally.

If specimen A is considered further, it will be noted that translocation of its outer portion is drastic during the drying process. For example, in a narrow imaginary margin having an area of 1 square centimeter adjacent to the inside of the periphery of specimen A, the cross-sectional area of the wood substance is 0.69 square centimeter and that of the water is 0.31 square centimeter. During the drying all the 0.69 square centimeter of wood substance in the outer 1 square centimeter margin is translocated within the central 2.76 square centimeter area represented in specimen A'. When a swollen fiber having a lumen is dried, the amount of translocation of the fiber wall is less severe, as will be seen by considering the next specimen.

Specimen B also represents a cross section of a swollen fiber having an external area of 4 square centimeters. The fiber wall has a cross-sectional area of 1 square centimeter, and the lumen has an area of 3 square centimeters. The lumen has been shown to remain statistically the same size by microscopical (1), permeability (9), and shrinkage measurements (10, 11) applied to the shrinking and swelling of wood subject to unrestrained and noncollapsible conditions. The cross-sectional area of the wood substance in the swollen fiber wall is 0.69 square centimeter and that of the adsorbed water is 0.31 square centimeter. Consequently, the swollen fiber wall, on drying, will shrink 0.31 square centimeter. Thus, the cross-sectional area of the dry fiber is 3.69 square centimeters ($4 - 0.31 = 3.69$), as shown by specimen B'. When the shrinkage of the specimen is completed, all of the fiber wall will occupy the inner 0.69-square-centimeter portion of the same square centimeter it occupied in the swollen condition. A fiber wall of a fiber having a lumen is thus translocated much less than is an equivalent portion of a hypothetical solid fiber.

Specimen C represents a cross section of a swollen fiber with the same external dimensions as in A and B. The area of the cross section of the fiber wall is equal to 3 square centimeters, and that of the lumen to 1 square centimeter. The moisture in the specimen occupies 0.93 square centimeter ($3 \times 0.31 = 0.93$) so that on drying, the cross-sectional area of the dry fiber will be 3.07 square centimeters ($4 - 0.93 = 3.07$), as represented by specimen C'. The cross-sectional area of the dry wood substance in the fiber wall is 2.07 square centimeters ($3 - 0.93 = 2.07$). After drying, the wood substance in the fiber wall will occupy the inner 2.07 square centimeters of the same 3-square-centimeter area it occupied in its swollen condition.

If the crystallites in the primary layer of the fiber wall were arranged approximately parallel to the long axis of the fiber, similarly to those in the secondary layer, a portion of the fiber wall would shrink into the lumen of specimen B and C. Because the crystallite arrangement in the primary layer differs from that in the secondary layer, the external shrinkage of specimens B and C is only 0.31 square centimeter and 0.93 square centimeter, respectively. Calculated on a percentage basis, the external shrinkage of the green specimens A, B, and C is 31.0, 7.75, and 23.25 percent, respectively. The difference between the external shrinkage values of A and B is 23.25 percent, and that between A and C is 7.75 percent.

The fact that the lumen of fibers remains practically the same in area during shrinkage indicates that some internal shrinkage occurs. In the shrinkage of the hypothetical fiber (Fig. 4, A) which, having no lumen, can have no internal shrinkage, any point on the cross-sectional area of the fiber wall translocates toward the center. And, since the lumen of a fiber approximates the same cross-sectional area, regardless of the moisture-equilibrium conditions, the inner part of the cell wall must move outward during drying, otherwise the

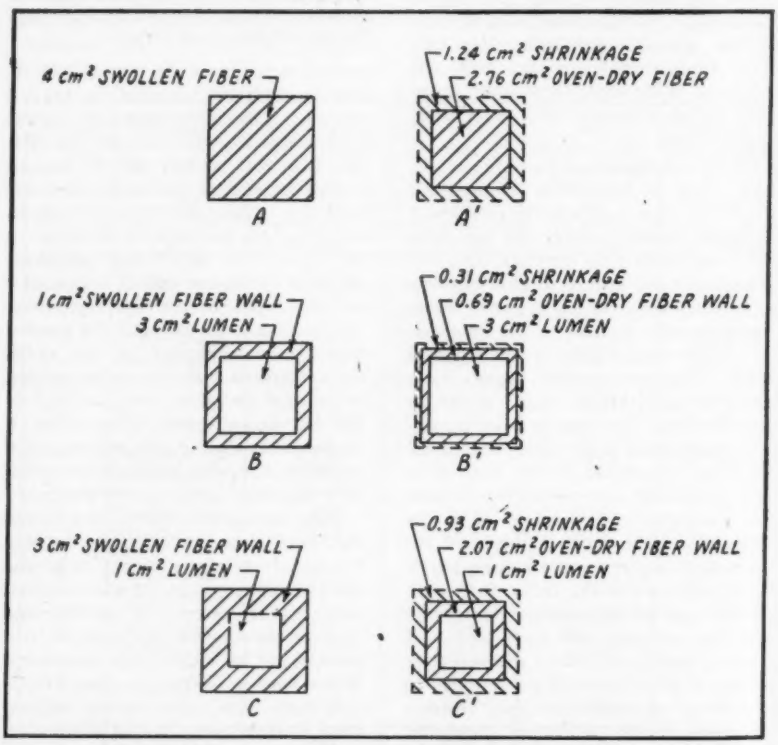


Figure 5—Translocation of fiber wall during the drying of water-soaked wood. A, Cross section, 2 by 2 centimeters, of an enlarged hypothetical lumen-free swollen wood fiber. A', Oven-dry specimen, showing shrinkage and dry fiber. B, Cross section, 2 by 2 centimeters, of an enlarged swollen fiber, of which the fiber wall cross section is one-fourth the over-all fiber. B', Oven-dry specimen showing shrinkage of fiber wall and lumen. C, Cross section, 2 by 2 centimeters, of an enlarged swollen fiber, of which the fiber wall cross section is three-fourths of the over-all fiber. C', Oven-dry specimen showing shrinkage of fiber wall and lumen

cross-sectional area of the lumen would change considerably as drying of the cell wall progresses.

Summary

Data have been presented to show that isolated ray cells shrink and swell in their longitudinal direction, which is the radial direction of wood, to the same extent as does the wood from which they were isolated. Data are also included that show the chemical removal of ray cells from woods does not modify the shrinking and swelling of the wood. These findings are in agreement with previously reported microscopical and X-ray data, but they are at variance with the earlier belief that ray cells restrain radial shrinking and swelling.

Greater shrinking and swelling of the dense summerwood than that of the springwood in the tangential direction was shown to account for only a small part of the greater tangential than radial shrinking and swelling. It was shown that the difference between radial and tangential shrinking and swelling can be accounted for on the basis of the crystallite structure being bent around the pits, which are predominantly in the radial wall. This structure introduces a longitudinal component into the dimensional changes of the radial wall and thereby lessens radial shrinking and swelling.

The primary layer cellulose crystallites, which are arranged parallel to the transverse perimeter of the fibers, restrain external shrinkage of the fibers. This restraining effect increases with increased size of the fiber lumen; accordingly, the external shrinkage of the wood decreases, in general, with decreasing specific gravity of the wood.

References

(1) Beiser, W. Kolloid Zeit. 65:203 (1933).

(2) Frey-Wyssling, A. Holz als Roh und Werkstoff 3(2):43 Feb. (1940).

(3) Gross, S. T., Patzer, W. A., and Ritter, Geo. J. Paper Trade J. 109(23):37 (1939).

(4) Koehler, A. "Properties and Uses of Wood," McGraw-Hill Book Co., New York (1924).

(5) MacLean, J. D. Am. Soc. Heating and Ventilating Eng. 47:734 (1941).

(6) Markwardt, L. J., and Wilson, T. R. C. U.S. Dept. Agric. Tech. Bull. 479, "Strength and Related Properties of Woods Grown in the United States" (1935).

(7) Ritter, Geo. J., and Mitchell, R. L. Paper Trade J. 108(6):33 (1939).

(8) Rowley, F. B. Heating, Piping and Air Conditioning 5:313 (1933).

(9) Stamm, A. J. Ind. Eng. Chem. 27:401 (1935).

(10) Stamm, A. J. Physics 6:334 (1935).

(11) Stamm, A. J., and Loughborough, W. K. Am. Soc. Mech. Eng. Trans. 64:379 (1942).

(12) Wangaard, F. F. "The Mechanical Properties of Wood," John Wiley and Sons, Inc., New York (1950).

Lift-truck with paper-roll clamp shows . . .

How to make the most of storage height

In plants where floor space is at a premium, and where considerable storage of different types of products is involved, the modern method of storing materials ceiling high becomes particularly important. There are many places, however, where high storage is practiced, but where still better use can be made of available storage height. Materials of many different kinds are now transported and stacked several units high by mounting them on skids or pallets, which can be handled with power lift-trucks, usually of fork type.

In some cases, these pallet or skid loads are deposited in racks, three or four compartments high. This is highly convenient in cases where the type of material is not uniform from top to bottom of storage, because it allows removing a skid or pallet load from the lowest rack compartment, or from an intermediate compartment, without disturbing unit loads which have been stored in compartments above.

One must remember, however, that this additional convenience is obtained at the cost of sacrificing a certain amount of storage height. In many cases the amount of height thus lost would permit an additional unit load to be stored between floor and ceiling, if the racks were dispensed with. There is definitely a place for such racks, but just as definitely, there are cases where it is much better to stack pallet loads directly on top of one another in order to save storage height.

Another approach to this problem has been made by a leading manufacturer of power-type trucks, through use of a different type of pallet which is only one inch thick. These pallets are handled with hooks instead of forks. Since many pallets are five or six inches thick, use of a one-inch pallet means that from twelve to fifteen inches of storage height can be saved, assuming the material to be stacked three unit loads high.

Different types of handling equipment are sometimes designed to handle and stack materials in other ways calculated to save space. An instance in point can be seen in the accompanying illustration. Here a 2000-lb. capacity, electric powered lift-truck is equipped with a hydraulic, rotating paper-roll clamp. This unit was definitely designed for transporting and tiering rolls of paper. The device is capable of picking up a large roll of news print either in the vertical or horizontal position, and rotating it up to 360 degrees. The economy with which storage height is utilized in this plant as a direct result can be plainly seen.

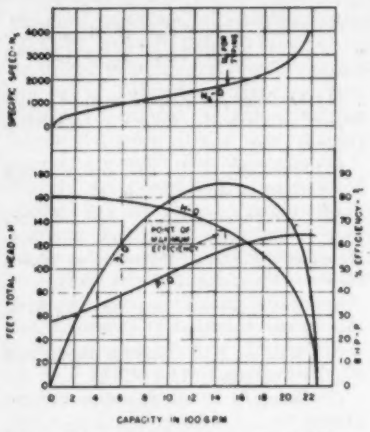


Fig. 1—Characteristics of a 6 in. discharge 8 in. suction double-suction single-stage volute at 1760 rpm. constant speed

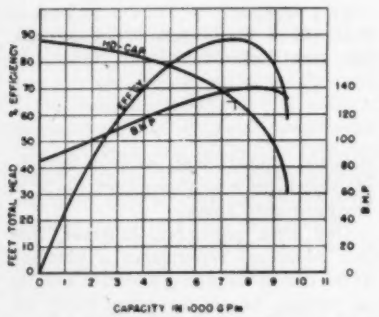


Fig. 7—Characteristics of a pump with non-overloading power curve with reduction in head

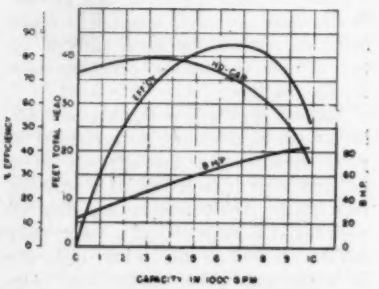


Fig. 8—Characteristics of a pump with overloading power curve with reduction in head

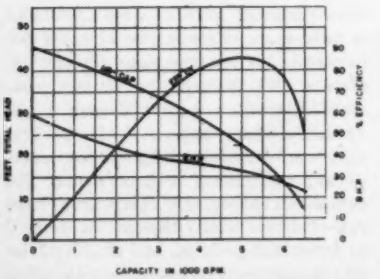


Fig. 9—Characteristics of a pump with overloading power curve with increase in head

Centrifugal Pumps

Part 18 of a Series

Characteristic curves and pump relationships

IGOR J. KARASSIK and ROY CARTER
Application Engineers
Worthington Pump & Machinery Corp.

CENTRIFUGAL PUMPS operating at constant speed can deliver any capacity from zero to a maximum value, dependent upon the pump size, design and suction conditions. The total head developed by the pump, the power required to drive it, and the resulting efficiency vary with the capacity. The interrelation of capacity, head, power and efficiency is called the characteristics of the pump. These interrelations are best shown graphically and the resulting graph is called the pump's "characteristic curves." It is usual to plot the head, power and efficiency against capacity at a constant speed as shown in Fig. 1; however it is possible, for special problems to plot any three components against any fourth component. When variable speed drivers are used, a fifth component, the pump speed expressed in rpm. is involved. Where suction conditions may be critical, the limit of suction lift vs. capacity or required NPSH (net positive suction head) vs. capacity is often shown. In design or application studies many other relations may be shown on the same graph.

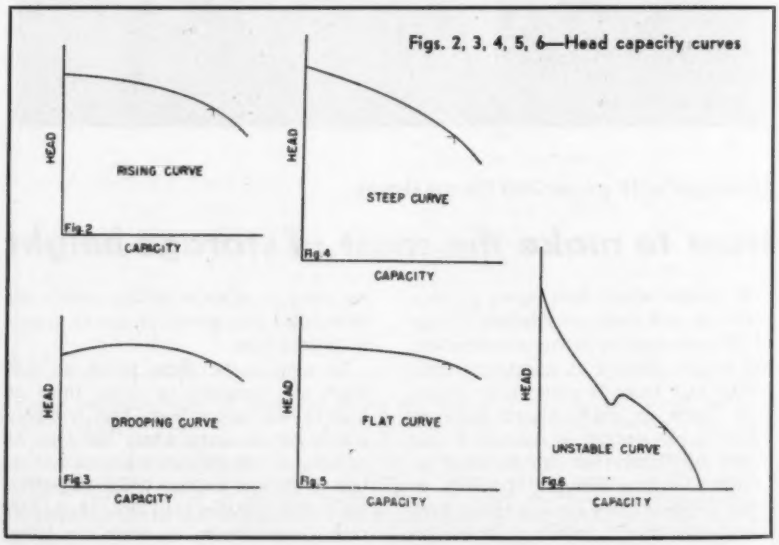
The curve H-Q in Fig. 1 showing the relation between capacity and total head is called the head-capacity curve.

The curve N-Q in Fig. 1 showing the relation between efficiency and capacity is properly called the efficiency-capacity curve, but is usually called the efficiency curve.

The curve P-Q in Fig. 1 showing the relation between power input and the capacity is the power-capacity curve, but generally called the power curve, the brake horse power curve or the BHP curve.

Usually the graph of a pump characteristic is made for a capacity range of zero to the maximum operating capacity and with the scales for head,

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republication are reserved by the authors.



Figs. 2, 3, 4, 5, 6—Head capacity curves

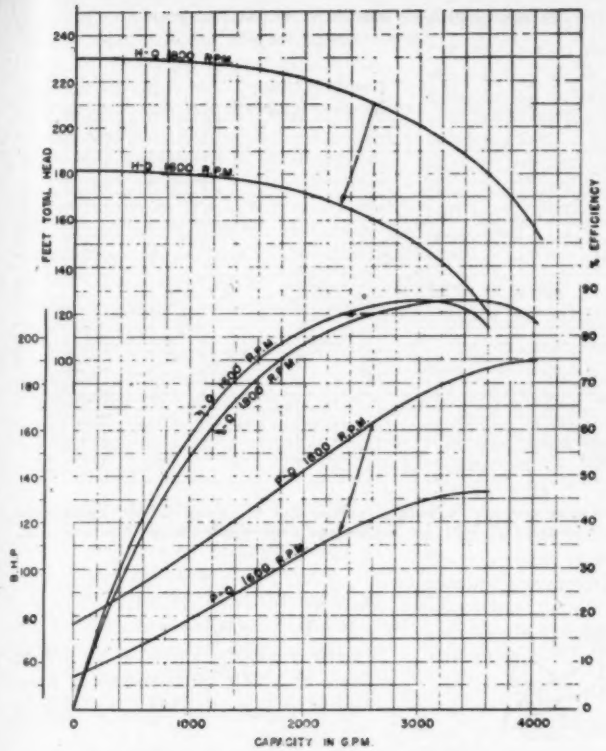


Fig. 10—Effect of speed change on pump characteristics

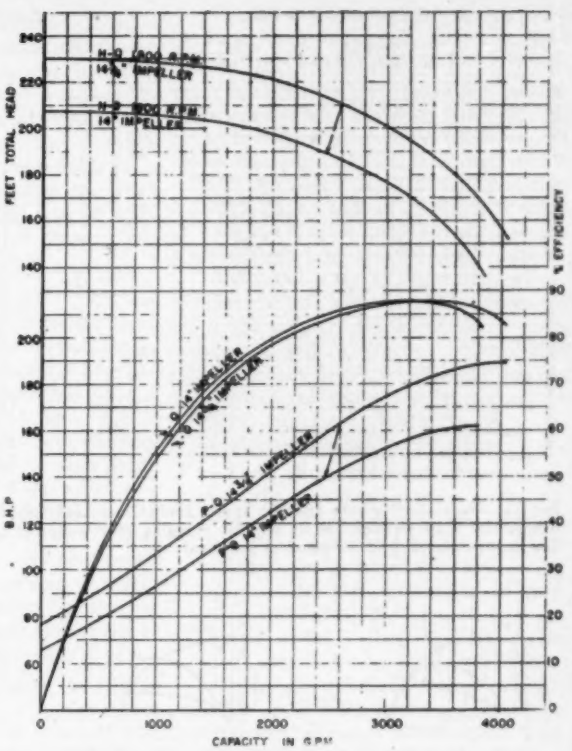


Fig. 11—Effect of impeller diameter change on pump characteristics

efficiency and Bhp. all having the same zero line shown on the lower part of Fig. 1.

In some cases, the curve is made for a limited range in capacity. In some cases to permit clearer presentation the head, efficiency and power scales are so selected that their zero lines do not coincide or these scales may be enlarged so their full range cannot be shown on the graph. Figure 10 is an example of such plotting of the characteristics of a pump.

Classification of H-Q curve shapes

Pump head-capacity curves are often classified by their shapes. Terminology in common use is:

(a) Rising characteristic or, more correctly, rising head-capacity characteristic, meaning a curve in which the head rises continuously as the capacity is decreased. (See Fig. 2.)

(b) Drooping characteristic, a shortened form of the true name of drooping head-capacity characteristic, covering cases in which the head-capacity developed at shut-off is less than that developed at some capacities. (This is also known as a looping curve.) (See Fig. 3.)

(c) Steep characteristic, referring to a rising head-capacity characteristic in which there is a large increase in head between that developed at design capacity and that developed at shut-off. (It is sometimes applied to a limited portion of the curve; for example a pump may be said to have a steep characteristic between 100 and 50 per cent of the design capacity.) (See Fig. 4.)

(d) Flat characteristic, referring to a head-capacity characteristic in which the head varies slightly with capacity from shut-off to design capacity. (The characteristic might be, in addition, either drooping or rising. All drooping curves have a portion in which the head developed is approximately constant for a range in capacity. In such cases that range is called the flat portion of the curve. The qualification of flat is also applied at times to indicate the general shape of other curves either for their full range or for a limited range.) (See Fig. 5.)

(e) Stable characteristic, referring to a head-capacity characteristic in which only one capacity can be obtained at any one head. (Basically this has to be a rising characteristic). (See Figs. 2, 4 and 5.)

(f) Unstable characteristic, referring to a head-capacity characteristic in which the same head is developed at two or more capacities. (See Figs. 3 and 6.) (The successful application of any pump is dependent as much upon the characteristic of the system on which it is operated as upon the head-capacity characteristic. Most pumping systems permit the use of pumps with moderately unstable characteristics.)

Classification of P-Q curve shapes

In addition to the names applied to the shape of the head capacity (H-Q) curves, the power-capacity (P-Q) curves have been classified according to their hapes. Fig. 7 illustrates a pump characteristic with a power (P-Q) curve which flattens out and then decreases as the capacity increases beyond the maximum efficiency point. This is called a non-overloading curve. When the power (P-Q) curve continues to increase with an increase in capacity as in the characteristic shown in Fig. 8, the pump is said to have an overloading curve. The shape of the power (P-Q) curves varies with the specific speed type. As a result the (P-Q) curve may be one which has a very low value at shut-off as illustrated in Figs. 7 and 8, it may be one which has a high shut-off power as illustrated in Fig. 9, or anything between these types. While in Fig. 8 the (P-Q) curve is of the overloading type with a decrease in head (and increase in capacity,) the (P-Q) curve shown in Fig. 9 is of the overloading type with an increase in head (decrease in capacity.)

While pumps with non-overloading power (P-Q) curves are advantageous because the driver is not overloaded under any operating conditions, they are not obtainable in all specific speed types of pumps. The actual range in operating conditions to be encountered in the oper-

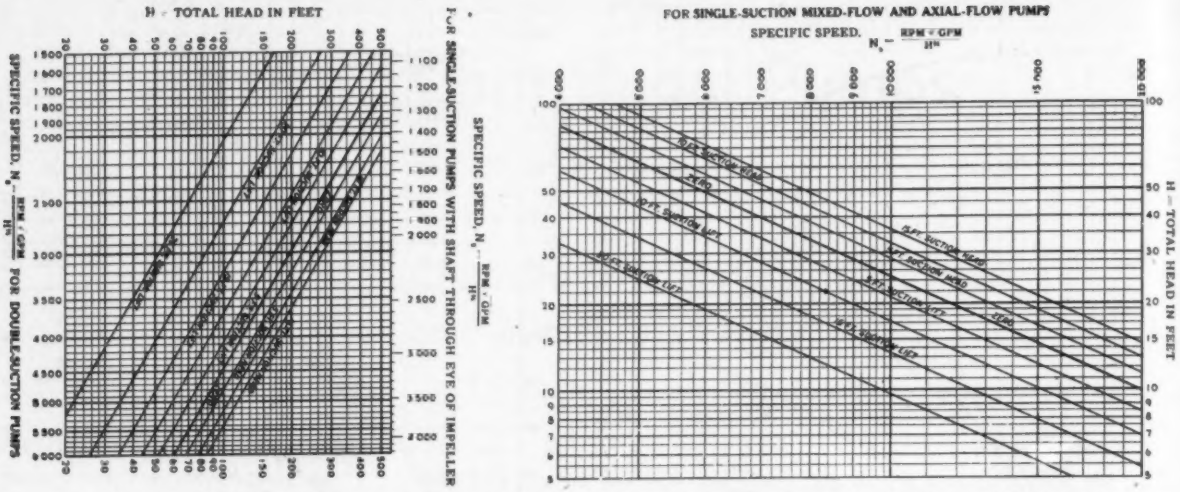
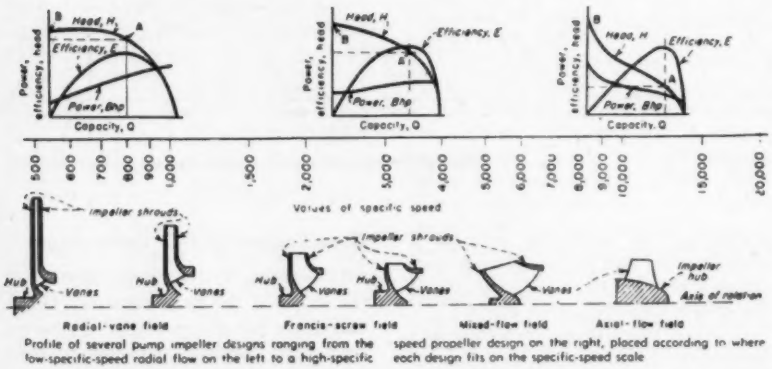

H = TOTAL HEAD IN FEET
FOR DOUBLE-SUCTION PUMPS
SPECIFIC SPEED, N = RPM × √GPM / H^¾
FOR SINGLE-SUCTION PUMPS WITH SHAFT THROUGH EYE OF IMPELLER
SPECIFIC SPEED, N = RPM × √GPM / H^¾
FOR SINGLE-SUCTION MIXED-FLOW AND AXIAL-FLOW PUMPS
SPECIFIC SPEED, N = RPM × √GPM / H^¾
H = TOTAL HEAD IN FEET
SUCTION HEAD
SUCTION LIFT

Fig. 12—Hydraulic Institute Specific Speed Limit Charts (a) left, for double-suction single-stage pumps and for single-suction single-stage pumps with shaft through eye of impeller pumping 85 F. water at sea level and (b) right, for single-stage single-suction mixed flow and axial-flow pumps pumping 85 F. water at sea level



Profile of several pump impeller designs ranging from the low-specific-speed radial flow on the left to a high-specific speed propeller design on the right, placed according to where each design fits on the specific-speed scale

Fig. 13—Specific speed yardstick of impeller profile and shape of characteristics

ation of a pump determines the range in power requirements and the driver size should be selected for the power to be encountered.

Mathematical relations of head, capacity, efficiency and Bhp

Useful work done by a pump is naturally the weight of liquid pumped in a period of time multiplied by the head developed by the pump. This generally expressed in terms of horsepower and is called Water Hosepower (Liquid Horsepower would be more correct.) It can be determined by the relation Whp. = Q × H × Sp. gr./3960 where Q = pump capacity in Gpm., H = total head in ft.

Power required to drive the pump is regularly determined in horsepower and is called the Bhp. input to the pump. The ratio of the Whp. output to the Bhp. input is the pump efficiency. The relation between Bhp., capacity, head and efficiency is therefore

Bhp. = QH/efficiency × sp. gr./3960

Centrifugal pump relations

There are certain relations whereby the performance of a centrifugal pump can be predicted for another speed than that at which the pump characteristic is known. There are also certain relations whereby we can predict the performance of a pump if the impeller were to be cut down in diameter (within a limit depending upon the impeller design) from the characteristics obtained at the larger diameter.

When the speed is changed,

(1) the capacity for a given point on the pump characteristics varies as the speed, *while at the same time*

(2) the head varies as the square of the speed, and

(3) the brake horsepower varies as the cube of the speed.

Putting these relations in the form of equations, we have

$Q = Q_1 \times (n/n_1)$

$H = H_1 \times (n/n_1)^2$

$P = P_1 \times (n/n_1)^3$

or $n/n_1 = Q/Q_1 = \sqrt{H/H_1} = \sqrt[3]{P/P_1}$

where n = New speed desired in Rpm.

Q = Capacity in Gpm. at desired speed n

H = Head in ft. at desired speed n for capacity Q

P = Brake horsepower at desired speed n at H and Q

n_1 = Speed in Rpm. at which the characteristics are known

Q_1 = A capacity at speed n_1

H_1 = Head at capacity Q_1 at speed n_1

P_1 = Brake horsepower at speed n_1 at H_1 and Q_1

On Fig. 10 there is plotted the 1800 Rpm. characteristics of a pump which indicates at that speed it produced 2600 Gpm. at 210.2 feet total head taking 162.5 Bhp. and having 84.9 per cent efficiency. If we desire to obtain the 1600 Rpm. characteristics, we would correct a number of 1800 Rpm. points to 1600 Rpm. The 2600 Gpm. point mentioned would be corrected to 1600 Rpm. as follows:

Q = 2600 × (1600/1800) = 2311 Gpm.

H = 210.2 × (1600/1800)² = 166.1 ft.

P = 162.5 × (1600/1800)³ = 114.1 Bhp.

The resulting 1600 Rpm. characteristics are also shown in Fig. 10.

These relations for change in speed can be used with safety for moderate changes in speed. They may not be found accurate in case of a large change in speed, particularly in case of an increase in speed.

It is also possible to reduce the diameter of the impeller by actually cutting it down in a lathe. The average impeller can be cut down in diameter about 20

per cent of its original maximum diameter without adverse effect. Cutting it down to less than 80 per cent of its original diameter will generally result in a much lower efficiency. This limit of 20 per cent is of course merely approximate as some designs of impellers can be cut more than this, while others cannot be cut over a small percentage without adverse effect. Actually any change in diameter will affect the proportions of the impeller and some variations from the theoretical results should be expected when tested.

It is found if an impeller of a suitable design is cut in diameter that, at the same speed, the characteristics of the pump will have a definite relation to its original characteristics or closely so. These relations are:

(1) the capacity for a given point in the pump characteristic varies as the impeller diameter, *while at the same time*

(2) the head varies as the square of the impeller diameter, and

(3) the horsepower varies as the cube of the impeller diameter.

Expressed in form of equations, these are:—

$$Q = Q_1 \times (D/D_1)$$
$$H = H_1 \times (D/D_1)^2$$
$$P = P_1 \times (D/D_1)^3$$

or

$$D/D_1 = Q/Q_1 = \sqrt{H/H_1} = \sqrt[3]{P/P_1}$$

where D_1 = Original diameter (inches)
D = Cut down diameter (inches)
Q_1 = Capacity with D_1 in. impeller
Q = Corresponding capacity with D in. impeller
H_1 = Head with D_1 in. impeller at capacity Q_1
H = Corresponding head with D in. impeller at capacity Q
P_1 = Bhp. with D_1 in. impeller at capacity Q_1 and head H_1
P = Bhp. with D in. impeller at capacity Q and head H

Considering again the same pump which at one point at 1800 Rpm. gave 2600 Gpm., 210.2 ft. Tdh., 162.5 Bhp., 84.9 per cent efficiency and which had an impeller diameter of 14¾ in. and assuming the impeller was cut to 14 in. diameter, the corresponding point on the characteristics of the pump with a 14 in. diameter impeller at 1800 Rpm. would be determined as follows:

$$Q = 2600 \times (14/14.75) = 2468 \text{ Gpm.}$$
$$H = 210.2 \times (14/14.75)^2 = 189.4 \text{ ft.}$$
$$P = 162.5 \times (14/14.75)^3 = 139 \text{ Bhp.}$$

Doing this likewise with a number of other points, sufficient points on the 1800 Rpm. characteristics of the 14 in. diameter impeller could be obtained to permit drawing the curves as appearing on Fig. 11.

Rating curves and charts

Rating curves and rating charts were originally intended for use by pump salesmen to make selections. They are now being more commonly used in bulletins and other sales literature and show in a condensed form, the possible range of applications of the pump for which it is made, either for a range in speed or for a range in impeller diameter.

Specific speed

The basic definition of specific speed is that it is the speed in revolutions per minute at which a theoretical and geometrically similar pump would run if proportioned to deliver 1 Gpm. against 1 ft. total head with its best efficiency at these service conditions. It is therefore an index of the pump type using the capacity and head obtained at the maximum efficiency point. It is sometimes desirable to determine the specific speed of a pump at a capacity and head other than that of best efficiency but such specific speed values should not be used as an index of the pump type.

It is desirable to consider the specific speed of a pump as a type number rather than the actual rotative speed of a 1 Gpm. 1 ft. total head model pump because, in most cases, such a model pump, if made, would not deliver that capacity and head.

The formula for determining specific speed is

$$N_s = n\sqrt{Q}/H^{3/4}$$

where N_s = Specific speed
Q = Gpm. capacity at speed n and head H
n = Rotative speed in Rpm.
H = Total head per stage in ft.

The normal range in specific speeds encountered in single suction impeller designs is from 500 to 15,000 with approximate impeller profiles as indicated on Fig. 13. Basically the lower the specific speed type, the higher the head per stage that can be developed by the pump.

For a given total head and suction lift condition, it has been found from experience that the specific speed of a pump should be below a certain value for successful operation and the Hydraulic Institute has issued charts, one (Fig. 12a) applying both to single-suction pumps with a shaft through the eye of the impeller and the other (Fig. 12b) applying to single stage single-suction mixed-flow and axial-flow pumps. (Both charts are based on 85 F. water at sea level). These have been generally called Specific Speed Limit Charts. It must be realized in using these that pumps built for the limit allowed are not necessarily the best design for the intended service and a lower specific speed type might be more economical. It must also be realized that the individual pump design limits its application for both maximum head and for suction condition limitations.

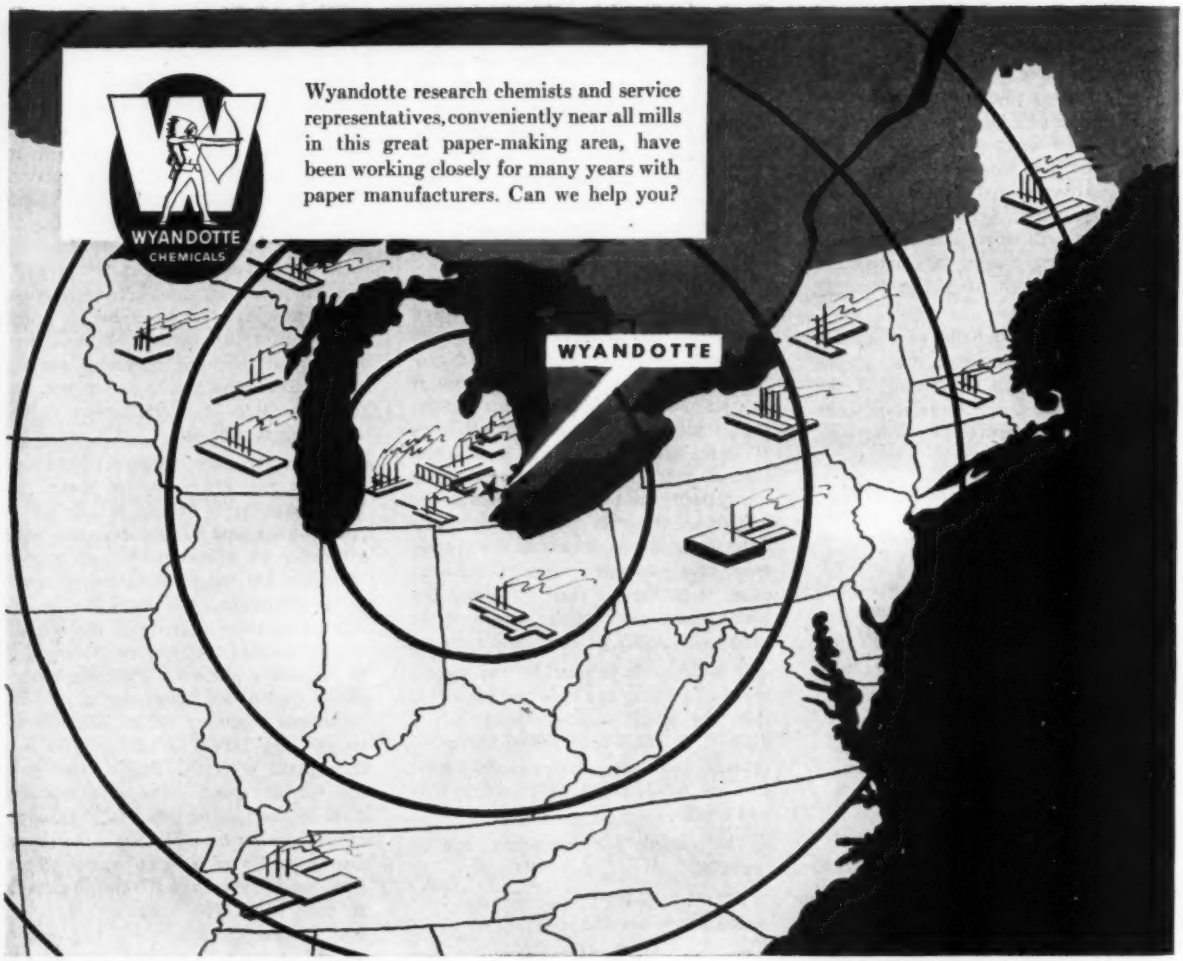
For example the maximum recommended specific speed for a double suction single stage pump is 2130 for 200 ft. total head and 15 ft. suction lift. It does not follow that all double suction single stage pumps of 2130 specific speed type are suitable for operation at speeds which will cause them to develop 200 ft. total head (at maximum efficiency), that the pump, if suitable for operation at 200 ft. total head is suitable for operation with 15 ft. suction lift, nor that a pump of this type operating against 200 ft. total head would on test only be found capable of operating on 15 ft. maximum suction lift.

These charts are intended to indicate only the maximum rotative speed for which experience has so far shown a centrifugal pump can be designed with assurance of a reasonable and proper operation for the combination of operating conditions. No restriction is indicated on these charts that the specific speed indicated corresponds to the point of maximum efficiency. Pumps are normally applied for conditions near their maximum efficiency points. Thus even though the service conditions do not correspond with the design conditions the specific speed value is sufficiently close to the specific speed of the design conditions. For example, Fig. 1 shows the characteristics of a 6 in. pump whose maximum efficiency is at 1480 Gpm. 132 ft. total head 1760 Rpm. and thus the true specific speed is 1740. This pump would normally be applied for a range of 1300 Gpm. 140 ft. total head to 1600 Gpm. 125 ft. total head, a range of specific speeds of 1590 to 1890, which varies about 10 per cent from the actual type N_s.

Comparing speeds

No attempt should be made to compare pumps on the basis of their specific speeds except for their design conditions. The reason for this is apparent when it is noted that every centrifugal pump has specific speed values from zero to infinity, as illustrated in Fig. 1, depending upon the particular point on the head capacity curve selected.

On Fig. 13 there is shown the type characteristics of a low specific speed pump, a medium specific speed pump and a high specific speed pump to illustrate how the shape of the pump characteristics change with impeller type. This is the major reason for the differences in the shape of pump characteristics. Some variation in the shape of the curves can be obtained in the design of the impeller and casing water ways, but the variation that can be thus obtained without adversely affecting the efficiency is relatively small.


WYANDOTTE
CHEMICALS
Wyandotte research chemists and service representatives, conveniently near all mills in this great paper-making area, have been working closely for many years with paper manufacturers. Can we help you?
WYANDOTTE

Prompt shipment of Soda Ash, and better SERVICE—from WYANDOTTE!

Convenient location of Wyandotte Chemicals, at the hub of the northern paper industry, helps us to serve you faster, better.

Here—at almost the exact center of the northern paper-making area—is your complete, reliable source for soda ash.

You benefit in prompt, fast shipment, better service, and *high quality*, too.

Consider all factors

Our range of grades, and the uniformity of Wyandotte Soda Ash, are other important factors you'll want to consider in selecting a source of supply for Soda Ash.

Wyandotte has a reputation for taking good care of the needs of our customers of record, *whether the supply is long or short.* We also supply the paper industry with high-quality caustic and chlorine. And our precipitated calcium carbonate, Purecal* M, is the whitest pigment-extender known.

We'll work with you

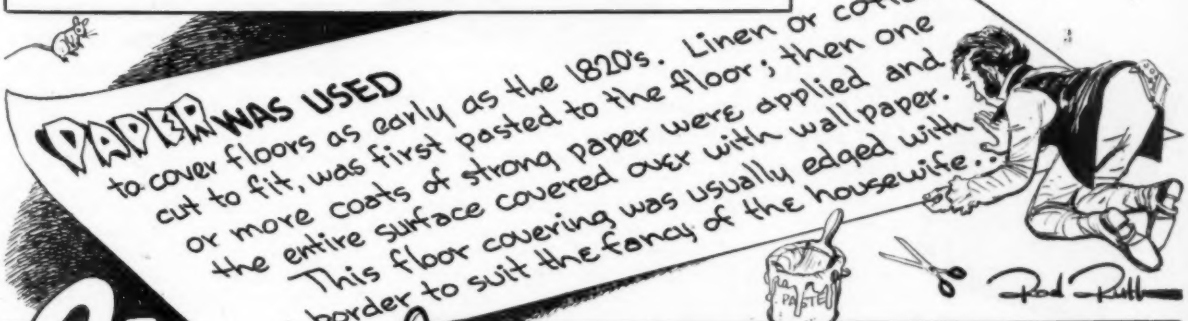
Our sales representatives and research laboratories (another Wyandotte advantage) will gladly assist you on any problem. Consult them now. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in Principal Cities.* *REG. U.S. PAT. OFF.

Wyandotte
CHEMICALS

PAPER SKETCHES

EARLY in the 1830's, Professor Schoenbein, inventor of gun-cotton, developed a transparent papier-maché from which he manufactured waterproof, shatterproof and transparent window panes, vases and bottles.

TALBOT of ENGLAND successfully produced photographic images on sensitized paper more than 113 years ago. . . Both his process and that of Daguerre, the Frenchman, were announced to the world in 1839.



PAPER WAS USED to cover floors as early as the 1820's. Linen or cotton cut to fit, was first pasted to the floor; then one or more coats of strong paper were applied and the entire surface covered over with wallpaper. This floor covering was usually edged with a border to suit the fancy of the housewife..

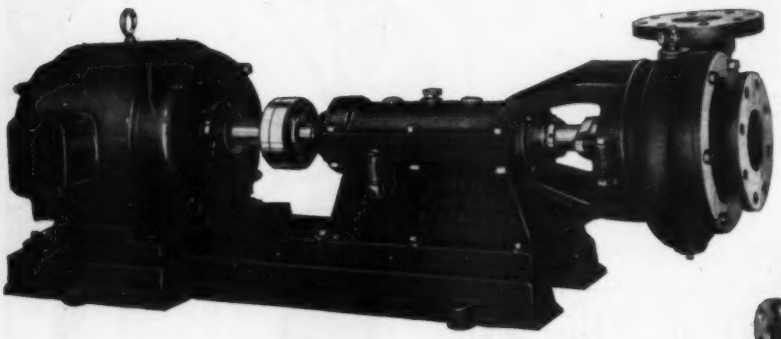
Odd Bits

AS AN AID in its effort to combat juvenile delinquency the Indiana State Board of Health uses check-protection paper to prevent the forgery of birth registration certificates..

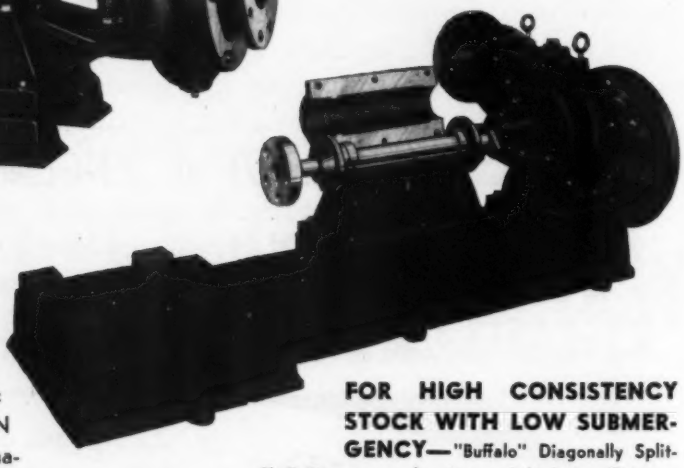
"Buffalo" Tips on Better Pumping

First, determine all expected conditions—nature of liquid to be pumped, consistency, temperature—discharge pressure—maximum and operating capacities—suction left on suction head. "Buffalo" builds a complete line of paper stock pumps, developed through the years to meet these specialized stock conditions. Below are shown two types, all proven over and over in the services indicated. "Buffalo" Engineers in all principal cities are ready to assist you in making the most satisfactory and economical choice.

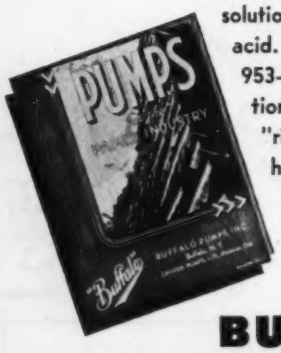
HOW TO Select the Pump Designed for Your SPECIALIZED STOCK JOB -



FOR SIZE, LIME, CLAY SOLUTION, SILICATE OF SODA, many corrosive solutions—"Buffalo" Full Ball Bearing Solid Shell Single Suction Pump.



ALSO AVAILABLE. RUBBER-LINED, this same pump is suitable for handling many corrosive liquids such as chlorinated solution and hydrochloric acid. WRITE FOR BULLETIN 953-G for further information on that all-important "right" pump for your stock handling needs.



FOR HIGH CONSISTENCY STOCK WITH LOW SUBMERGENCY—"Buffalo" Diagonally Split-Shell Pump—non-clogging and high in efficiency.

"Buffalo" PUMPS

BUFFALO PUMPS INC.

213 MORTIMER STREET BUFFALO, NEW YORK

Canada Pumps Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

Hardwood Processes Featured in November Lake States TAPPI Meeting

Technical experts from Wisconsin pulp and paper mills discussed hardwood pulping and bleaching processes at Lake States TAPPI's second meeting of the 1951-52 season. The gathering was held the afternoon and evening of November 15 in Wisconsin Rapids.

The formal meetings were preceded by a visit to the semichemical plant, the sulphite mill, the bleach plant, and the paper mill of Consolidated Water Power & Paper Co's. Wisconsin Rapids Div. An afternoon panel on the topic, "Hardwood Utilization" was led by C. R. Faulkender, technical director for Hoberg Paper Mills. At the evening dinner M. N. Taylor, executive director of Trees for Tomorrow, addressed the group on the objectives of that organization.

Modified Soda Process

First speaker on the technical program was Thilmany Pulp & Paper Co's. pulp mill superintendent, Paul West, who spoke on "Pulping of Hardwoods by Modified Soda Process." He described Thilmany's hardwood pulping by the kraft process, but noted that kraft hardwoods, especially poplar, are not too good for the firm's particular types of paper. About 4 per cent of the firm's wood consumption is poplar, which has to be used either straight or mixed up to 20 per cent of the wood furnish in regular kraft cooks. Poplar kraft did improve the mullen, made beating easier, and sometimes did not hurt the tearing strength of the finished paper because of the easier beating.

In 1945-46 some soda pulp was needed and bleaching kraft poplar with the conventional two-stage bleach was tried. Results were not too satisfactory. In 1947-48 some poplar was cooked with NaOH only, and spent liquors returned to the regular kraft recovery. Commercial 50 per cent caustic was placed in regular liquor storage, from which it went to the measuring system where it was diluted with water and sent to the digester. It was calculated that approximately 80 per cent of the NaOH charge was returned to the kraft recovery.

It was found that the modified soda poplar pulp was much easier to wash and handle than regular kraft poplar, permitting manufacture of about 50 tons daily of bleached soda poplar, as compared with only 25 of bleached kraft poplar. The soda pulp was better for soft, bulky sheets.

Sulphite Pulping

Henry Grabowski, sulphite superintendent for Falls Paper & Power Co., spoke on "Sulphite Pulping of Hardwoods." In preparing the paper, Mr. Grabowski sent questionnaires to all sulphite mills in Wisconsin asking for their production figures on hardwood sulphite for each year from 1946 through 1950, as compared with their total unbleached sulphite production. Replies from 11 mills showed that hardwood sulphite constituted 15.9 per cent of total unbleached sulphite production in 1946 and had risen to 22.2 per cent in 1950. These mills produce a total of about 450,000 tons per year of hardwood sulphite.

Six of the 11 mills cooked hardwood separately. Among the advantages for separate cooking were: (1) Hardwood can be pulped at a maximum temperature about 10C. lower than softwood sulphite; and (2) by cooking hardwood separately, there is more flexibility in the percentage of hardwood sulphite to be used in furnishes for various grades of paper.

Disadvantages of separate cooking included: (1) If slush systems are used, large storage capacity is required, and (2) if the pulp mill capacity is smaller than that of the paper mill, the hardwood and softwood can be cooked together, and various furnishes in the paper mill can be arranged by adding various amounts of purchased pulps, either hardwood or softwood as desired.

Cooking and Bleaching

George J. Brabender, assistant to the vice president for research, Marathon Corp., Rothschild, talked on "Cooking and Bleaching of Hardwood Kraft." Marathon cooks hardwood only in its Canadian mill, since timber rights there contain about 50 per cent hardwoods, one half of which is aspen. The aspen is larger and of higher density than U. S. aspen and is obtained in high grade, relatively pure stands.

Marathon has found that the strength of its bleached poplar kraft from aspen in the Canadian holdings approaches the strength of bleached hemlock sulphite from this area. The yield by weight from hardwood is considerably higher than it is from softwood. However, the lower density of the hardwood makes the yield per cord correspondingly lower for aspen. Balm of Gilead does not give as high quality pulp as aspen, although the yield is about the same; the fibres are shorter.

One important difficulty in cooking hardwoods by the kraft process is their effect on liquor recovery. The fact that hardwood gives better yield means that there will be lower dissolved solids in the

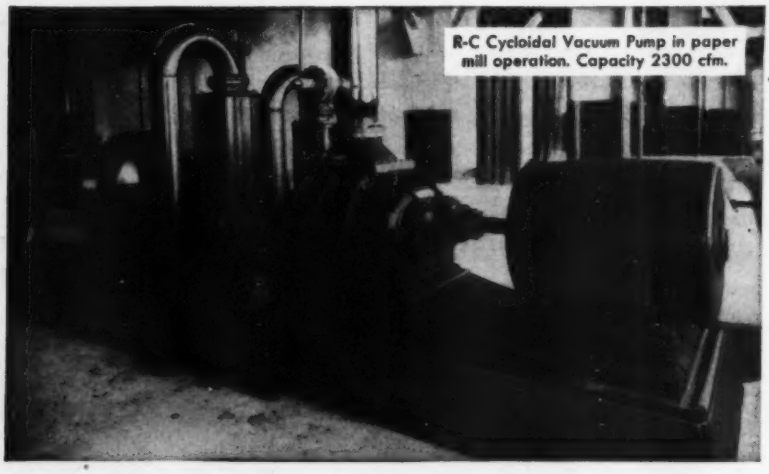
liquor sent to recovery (approximately 0.8 lbs. dissolved solids per lb. of pulp for hardwood, compared to 1.3 lbs. of solids per lb. of pulp for softwoods). This means that there is about 50 per cent more dissolved solids from softwood than hardwood, which makes it difficult to keep the fires in the recovery furnace going on the long runs necessary on hardwood.

Other speakers included Hugh Miller, pulp mill superintendent for Green Bay Paper & Pulp Co., who spoke on "Semi-chemical Pulping of Hardwood," and C. K. Textor, in charge of the Pulp and Paper Div. of Bauer Bros., whose subject was "Development in the Refining of Hardwoods."

U. of Florida Announces $1,000 Fellowship

The University of Florida has announced the establishment of the $1,000 William H. Brydges Fellowship in Paper and Pulp Research. The funds have been made available by the American Pulp and Paper Mill Superintendents Association through D. J. Murray Mfg. Co. The grant is to be used to advance fundamental knowledge in some phase of the pulp and paper industry. The problem selected for study should be one of direct interest to southern mills. Results of the research will be presented as a paper before the Superintendents Association.

Applications for the fellowship are open to students who have or will have a baccalaureate degree in chemical or mechanical engineering by June 1952. The candidate will be expected to enroll in the graduate school for study toward either the degree of Master of Science in engineering or Doctor of Philosophy.



R-C Cycloidal Vacuum Pump in paper mill operation. Capacity 2300 cfm.

CHECK VACUUM PUMPS ON THESE 5 POINTS

Whether for unit installations or central systems, be sure you obtain these basic essentials for successful performance of vacuum pumps:

1. **LOW POWER CONSUMPTION**—because units are recommended, either single or compound, to operate at the most efficient point.
2. **NEGLIGIBLE FRICTION LOSSES**—no contact between impellers or impellers and casings.
3. **HIGHER SPEEDS**—permitting direct connection to standard motors, saving first cost, space and weight.
4. **FLEXIBILITY**—to meet varying demands; suction automatically overcomes resistance in system.
5. **DEPENDABILITY**—long-time, attention-free operation, due to simplified design and construction.

Because of strict adherence to these 5 requirements, R-C Cycloidal Vacuum Pumps have long been favorites for paper mill operation.

Roots-Connersville Blower Corporation
510 Monroe Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE
BLOWER BUILDERS SINCE 1854
ONE OF THE DRESSER INDUSTRIES

Supts. Appoint Representatives for Four Divisions

The appointments of industrial affiliate representatives for four divisions have been announced by the Superintendents Association.

Tany Agronin of Shartle Bros. Machine Co., Middletown, Ohio, has been named representative for the Miami Valley Division for 1951-52. C. Y. Cain, midwestern representative of Hooker Electro-Chemical Co., has been appointed to a similar position for the Northwestern Division.

C. I. Horton of R. T. Vanderbilt Co., South Norwalk, Conn., has been made representative for the Connecticut Valley Division for the second straight year. And John Dieffenderfer of Hercules Powder Co., Wilmington, Del., has been chosen by the Pennsylvania-New Jersey-Delaware Division.

150 Attend Connecticut Valley Supts. Meeting

The annual fall meeting of the Connecticut Valley Supts. Association was held October 13 at the Berkshire Inn. Great Barrington, Mass. Some 150 members attended the gathering, which featured a tour of the Clark-Aiken Co. plant at South Lee, Mass., and a golf tournament.

Officers reelected were: Alfred L. Montagna, Southworth Co., chairman; Edward McQuillen, American Writing Paper Corp., first vice chairman; John Murphy, Chemical Paper Mfg. Co., second vice chairman, and John D. Retallick, Bradford West Co., Pittsfield, Mass., secretary-treasurer.

Delaware Valley TAPPI Sponsors Annual Competition

The Albert Award for outstanding technical papers in the pulp and paper field has been established by the executive committee of the Delaware Valley Section of TAPPI. The annual prize of $50 is named in honor of Edward J. Albert, one of the section's founders.

Created in order to give young men more opportunity and recognition in the industry, the award is to be confined to

persons actively engaged in the field. Papers must deal with some technical aspect of the manufacture of pulp and paper and be associated with some operation, process, or investigation with which the author has been concerned.

Converting Discussed at Lake Erie TAPPI

Typical problems encountered by the converter were discussed October 19 at the regular meeting of the Lake Erie Section of TAPPI held in Cleveland. William Hasselo of Container Corp. of America presided.

Guest speakers were P. H. McDowell, director of purchases for A. L. Garber Co., Ashland, Ohio, and R. O. Spalding, corrugated quality supervisor for Owens-Illinois Glass Co., Toledo.

During the discussion, elements complicating the manufacture of cartons were described. According to the speakers, there is a need of properly designed containers to minimize breakage and a suitable container having proper functionability. Present methods of evaluating corrugated containers are not adequate when dealing with the design of corrugated containers used for packaging items in glass. Some of the defects in boxboard discussed included proper moisture content, uniform basis weight and caliper, adequate surface treatment for prevention of picking and resistance to gloss inks, freedom from dirt, and proper sheet and roll dimensions.

Fourth Bolton Award Winners Announced

Winners of the fourth Bolton Award Contest, sponsored by John W. Bolton & Sons, Inc., Lawrence, Mass., have been announced by the American Pulp & Paper Mill Superintendents Association. Subject of the competition was "Why Profit is Everybody's Job," and manuscripts were received from all parts of the country and Canada.

The winners of the three major awards were Frank Thompson, Champion Paper & Fibre Co., Hamilton, Ohio, first prize; William H. Chandler, S. D. Warren Co., Cumberland Mills, Maine, second prize, and Bemis P. Wood, Strathmore Paper Co., West Springfield, Mass., third prize.

Winners of the divisional awards were as follows: Connecticut Valley, Sidney A. Brown, Rogers Corp.; Miami Valley, D. W. Newell, Philip Carey Mfg. Co.; Michigan, William F. Hathaway, Kalamazoo Vegetable Parchment Co.; New York-Canadian, S. H. Andrian, A. P. W. Products Co.; Northeastern. O. E. Anderson, International Paper Co.; Northwestern, Bruce J. Boerner, Cornell Wood Products; Pacific Coast, W. C. Gigler, Crown Zellerbach Corp.; Pennsylvania-New Jersey-Delaware, G. S. Brickett, Congoleum-Nairn; Southeastern, Robert H. Aronow, West Virginia Pulp & Paper Co., and Southern, J. H. Groves, Union Bag & Paper Corp.

Ohio TAPPI, Miami Valley Supts. Hold Joint Meeting

The Ohio Section of TAPPI met in a joint meeting with the Miami Valley Superintendents Association at the Hartwell Club of the Cincinnati Gas & Electric Co. November 8. Principal speaker

PARTICIPANTS IN THE JOINT MEETING of the Ohio TAPPI and the Miami Valley Supts. were W. C. Bloomquist of GE, speaker, and Herb Smith, sectional TAPPI chairman.

of the evening was W. C. Bloomquist of the Industrial Engineering Division, General Electric Co.

Serving as chairman was J. R. Hartman, vice president of Cincinnati Gas & Electric. It was announced that the next TAPPI meeting would be held in Columbus December 11 and would feature a tour of the Battelle Memorial Institute. The topic for discussion was to be graphic arts.

Quality Control Discussed at Western New York TAPPI

The definite relationship between cost and quality was the subject of a talk by Howard Bolton, assistant superintendent of inspection for the Radiator Div. of General Motors, as he addressed the December meeting of Western New York TAPPI at Niagara Falls.

There are two major factors that are essential in effecting quality control: (1) variables that offset quality and (2) working standards. Among the former are personnel, machinery and equipment, materials and variations of materials, and working conditions. Working standards are established by various methods. Some are set up by the government, some by customers, and some by industrial engineering departments.

Better quality costs more because of the use of higher skilled operators and better equipment. Statistical quality control is one of the tools used in governing quality production. By use of charts, test results may be analyzed to control production.

A TAPPI-Sponsored Paper-Plastics Conference was held recently at the State University College of Forestry, Syracuse University, Syracuse, N.Y. Approximately 200 industrial, research, and educational authorities in the plastics field attended. Principal speaker was Walter L. Hardy of Leeds Sales Co., New York, N.Y., whose topic was "Industrial Packaging."

Kalamazoo Valley TAPPI and the Michigan Division of the Superintendents Association were to hold their annual joint meeting January 10 at the Hotel Harris, Kalamazoo. Among the scheduled speakers was to be A. E. Harold Fair, president and general manager of Alliance Paper Mills Ltd., Toronto. He was to speak on the topic, "The New Challenge." Presiding was R. H. Peeters of St. Regis Paper Co., Kalamazoo, chairman of the Michigan Division of the Superintendents Association.

George C. Borden Jr., technical director of Riegel Paper Corp., Milford, N.J., has been elected chairman of the technical committee of the Glassine and Greaseproof Manufacturers Association. His election came at a meeting of the group in Chicago November 28. Mr. Borden succeeds S. C. Fairbanks, head of research for Hamersley Mfg. Co., Garfield, N.J., who had served as chairman two years.

Connecticut Valley Division of the Superintendents Association will hold a dinner meeting February 1 at the Roger Smith Hotel in Holyoke, Mass. The featured speaker is to be Dr. Allan A. Stockdale of the National Association of Manufacturers.

Chicago Section of TAPPI staged its yearly Christmas dinner meeting December 17. Approximately 90 attended the gathering. Edwin L. Baron, hypnotist, and a strolling string trio provided entertainment. V. V. Vallandigham, chairman of the section, presided. Peter Trucano was chairman of the program committee.

Miami Valley Division of the Superintendents Association has announced that Charles P. Taft, Cincinnati lawyer and brother of Sen. Robert A.

Taft, was to address its January 24 dinner meeting at the Manchester Hotel, Middletown, O. His subject was to be, "How Did Any of Us Learn About Organization?"

Empire State TAPPI,
eastern district, discussed stock inlets at a dinner meeting in Glens Falls, N.Y., Octobeer 18. Participating in the panel were Harold A. Norseen of Valley Iron Works; P. A. Jackson of Pusey & Jones Corp., and Paul Fasoli of Sandy Hill Iron & Brass Works. Foster P. Doane Jr. of Sandy Hill, vice chairman of Empire State TAPPI, was moderator.

Pacific Coast Supts. Assoc.
was to hold its fall meeting November 30 at the New Washington Hotel in Seattle. One-half day was devoted to mill visits, while the remainder was spent in technical sessions. Also included was to be a men's luncheon, a banquet, and dance.

Canadian Pulp and Paper Assoc.
will hold its 39th annual meeting in conjunction with the 38th annual meeting of the CPPA Technical Section at the Mount Royal Hotel, Montreal, January 23-25, 1952. D. W. Ambridge, president of Abitibi Power & Paper Corp., is chairman of the CPPA meeting, while W. W. Holland of Oxford Paper Co., Oxford, Maine, is chairman of the Technical Section. The meeting will feature business sessions, election of officers, group discussions, technical papers, and technical displays.

IF IT'S A DEXTRINE, STARCH OR ADHESIVE PROBLEM..

"Put it up to

Morningstar"

Let Our Paper Department Experts Give You Valuable Aid on..

1. TUB AND COATING STARCHES
2. TAPIOCA FLOURS
3. CONVERTED POTATO STARCHES
4. LAMINATING ADHESIVES
5. BAG PASTES
6. CORRUGATING STARCHES
7. MANNOGAL (Mannan-Galactan) PRODUCTS

Morningstar's modern laboratories and technical experts can lend you valuable aid on your Dextrine, Starch and Adhesive problems. Years of intensive research have resulted in the development and perfection of a specialty line of exclusive products for the paper industry. Without obligation, our paper specialists will gladly study your individual mill requirements and recommend the most efficient and economical formula to improve the operation you describe.

WRITE US—TELL US ABOUT YOUR NEEDS!

MORNINGSTAR, NICOL, INC.

630 WEST 51st STREET, NEW YORK 19, NEW YORK
1770 CANALPORT AVENUE, CHICAGO 16, ILLINOIS

American Forest Products Industries Elects Officers

James L. Madden, president of Hollingsworth & Whitney Co., was recently elected president of American Forest Products Industries, Inc. Mr. Madden, whose offices are in Boston, succeeds N. F. McGowin of W. T. Smith Lumber Co., Chapman, Ala. Mr. McGowin remains a member of the board of trustees.

Other officers of the organization, re-elected at the Washington, D.C., meeting, include the following: William B. Greeley, Seattle, chairman of the board; Walter J. Damtoft, Champion Paper & Fibre Co., Canton, N.C., and Clyde Martin, Weyerhaeuser Timber Co., Tacoma, Wash., vice presidents; P. H. Glatfelter, P. H. Glatfelter Co., Spring Grove, Pa., treasurer.

National Paperboard Assoc. Elects Officers

Marvin W. Swaim of Alton Box Board Co., Alton, Ill., was elected president of the National Paperboard Association at the group's annual meeting, held in New York, N.Y., early in November. He succeeds George E. Dyke, president of Robert Gair Inc., who had held the post for five terms. Elected vice president was Ralph A. Powers, president of Robertson Paper Box Co., Montville, Conn.

It was formally announced at the meeting that Frederick G. Becker, for many years executive manager of the association, was retiring from active participation. He is succeeded by Albert W. Luhrs, South Orange, N.J. Mr. Becker retains his connection with the group as executive adviser.

Packaging Institute Elects Officers

More than 1,000 persons attended the Thirteenth Annual Forum of the Packaging Institute, which was held at the Commodore Hotel, New York, N.Y., during the last week of October.

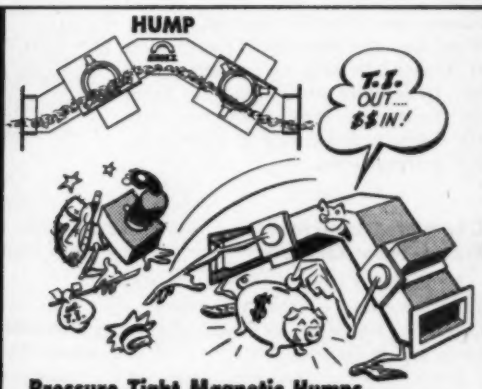
New officers elected by the directors were as follows: Robert de S. Couch, General Foods Corp., president; R. Chester Reed, The Texas Co., vice president, and F. S. Leinbach, Riegel Paper Corp., vice president. Dr. L. V. Burton was reappointed executive director.

Directors elected include Mr. Couch; E. F. Dival, Corn Products Refining Co.; G. Norwood Fisher, Kraft Foods Co.; H.

ERIEZ MANUFACTURING CO., ERIE, PA., U.S.A. • PRODUCERS OF MAGNETIC SEPARATORS AND SELLERS OF (RCA) ELECTRONIC METAL DETECTORS

Protect Paper Machinery from Harmful Metal with Eriez Permanent Magnetic Separators

Remove dangerous tramp iron in pulp and paper manufacturing operations...eliminate damage to machinery . . . cut product contamination. Installed at strategic points in pulp mills and papermaking production lines, these heavy-duty separators snatch tramp iron from flowing chips, pulp, and slurry. Foreign metals are stopped before they cause damage to moving machinery or find their way into finished products. (In processing of dry materials, particularly in pneumatic systems, magnetic separators eliminate risk of fire or explosion caused by sparks.)



Pressure Tight Magnetic Humps

installed on paper slurry lines have been saving $1000 monthly on the two jordans of a large eastern paper manufacturer. Eriez Humps have eliminated tramp iron troubles for this company.

Eriez Plate-Type Giant Magnets

in head boxes provide protection for refiners, jordans, hydropulpers, and pumps . . . clean slurry of stray metal which can chew up your machinery. This is a proved low-cost means of preventing damage to paper processing equipment.

Magnetic Pulleys and Plates

clean dry wood chips ahead of digesters . . . remove tramp iron before it can damage wood hogs or foul valves in digesters.

Magnetic Slurry Drum

snatches tramp iron right out of slurry line, cleans itself and deposits metal in a tray. ERIEZ TRAPS in liquid flow lines halt pieces of tramp iron...keep them out of pumps.

JUST OFF THE PRESS! GENERAL CATALOG #15, WRITE NOW!

ERIEZ MANUFACTURING COMPANY
215 STATE STREET, ERIE, PA.

MY CONTAMINATION OR SEPARATION PROBLEM IS:

_____

_____

PLEASE SEND LITERATURE ☐ CATALOG #15 ☐
HAVE REPRESENTATIVE CALL ☐ PROMPTLY ☐ WHEN IN AREA

NAME _____
TITLE _____
COMPANY NAME _____
STREET _____
CITY _____ ZONE ___ STATE _____

52-A

Lyle Greene, Peters Machinery Co.; F. S. Leinbach, Riegel Paper Corp., and H. A. Miller, Burt Machine Co. Appointed a director to fill a vacancy was Herbert T. Holbrook, Standard Cap & Seal Corp. Messrs. Couch, Greene, Leinbach, and Miller were reelected.

Philadelphia Paper & Cordage

Association has elected John A. Downes of Stocker Mfg. Co. president for 1952. He succeeds Harold T. Robinson, Whiting-Patterson Co. Other officers named were Alfred T. Snowden of D. L. Ward Co., vice president; Perce Belfield of Wortendyke Mfg. Co., secretary, and Ray Underdown of Quaker City Paper Co., treasurer. Named directors were Mr. Robinson and George R. Niswander, mill representative.

Chemists Association Elects New Officers

New officers elected at the October 23 annual meeting of the Association of Consulting Chemists and Chemical Engineers are as follows:

Erwin DiCyan, consulting chemist, DiCyan & Brown, New York, N. Y., president; Earl D. Stewart, director of research for Schwarz Laboratories, Inc., New York, vice president; William C. Bowden, Jr., technical director, Ledoux & Co., Inc., New York, secretary, and Foster Dee Snell, president of Foster D. Snell, Inc., New York, treasurer.

Councilors elected to three-year terms include Robert S. Aries, Aries & Associates, New York; Elliot A. Haller, vice president, Haller Testing Laboratories, Inc., New York; Hugo Klein, consulting chemical engineer, Altadena, Cal.; Clarence E. Mange, consulting engineer, C. E. Mange Development Laboratory, St. Louis, Mo., and Robert V. Siebel, president, Siebel Central Laboratories, Inc., Chicago.

Association of American Wood Pulp

Importers elected 1952 officers at a meeting in New York, N.Y., December 13. Albert H. Blattmann was named president. Other officers chosen were John Westergaard, vice president; Harold J. Lanney, secretary; V. Ramsey, treasurer, and Stanford G. Blackinship, director.

The Instrument Society of America

held its sixth annual conference and exhibit in Houston, Texas, September 10-14. More than 7,000 instrument engineers, mechanics, manufacturers, and suppliers from throughout the world attended, while 154 exhibiting firms displayed $10,000,000 worth of instruments.

New national officers chosen during the meeting were Dr. Arnold O. Beckman, president; David M. Boyd, Jr., vice president, and Robert T. Sheen, vice president.

Glassine & Greaseproof Mfg. Assoc.

was presented an award of merit during the recent meeting of the American Trade Association Executives at Chicago. The award was made in recognition of the Association's work in gathering statistical data relative to industry operating techniques.

The Paper Mill Men's Club

of Southern California held its annual Hi-Jinks at the Oakmont Country Club, Glendale, on September 28. More than 500 attended the affair, participating in golf, softball, and horseshoes. A floor show with Hollywood stars was featured during the banquet.

Coming Events

Feb. 17-21—American Pulp & Paper Association, annual meeting, Waldorf-Astoria Hotel, New York, N.Y.

TAPPI meetings

Feb. 18-21—Annual meeting, Commodore Hotel, New York, N.Y.

May 5-8—Third Coating Conference, Sherman Hotel, Chicago.

American Pulp and Paper Mill Superintendents Association meetings

Feb. 1—Connecticut Valley Division, Roger Smith Hotel, Holyoke, Mass.

March 21—Miami Valley Division, Cincinnati Chemical Works.

April 24—Miami Valley Division, Manchester Hotel, Middletown, Ohio.

May—Miami Valley Division, Orr Felt & Blanket Co., Piqua, Ohio.

May 9-10—Pennsylvania-New Jersey-Delaware Division, Yorktowne Hotel, York, Pa.

Other meetings

Jan. 23-25—Canadian Pulp & Paper Association, annual meeting, Mount Royal Hotel, Montreal, Que.

Feb. 20—Salesmen's Association of the Paper Industry, annual meeting, Waldorf-Astoria Hotel, New York, N.Y.

March 16-18—American Institute of Chemical Engineers, Atlanta Biltmore Hotel, Atlanta.

March 26-April 6—Chicago International Trade Fair, Navy Pier, Chicago.

March 24-26—National Paper Trade Association, annual meeting, Waldorf-Astoria Hotel, New York, N.Y.

April 1-4—21st National Packaging Exposition, Atlantic City Auditorium, Atlantic City, N.J.

Star Performers on Important Duties
Aurora Non-Clog Pumps, both Vertical and Horizontal have won high favor
— for industrial by-products, semi-solids, wastes, municipal sewage plants, lift stations, buildings and all duties involving the handling of heavy liquids and liquids containing solids.
PUMPS "by Aurora"
Type KGG Aurora Horizontal Non-Clog Pump
Write for BULLETIN 121
Write TODAY for CONDENSED CATALOG "M"
DISTRIBUTORS IN PRINCIPAL CITIES
AURORA Always PUMPS
AURORA PUMP COMPANY
110 Loucks Street, Aurora, Illinois

In The Paper Industry

WESTERN PRECIPITATION

COTTRELL EXPERIENCE IS UNSURPASSED

– Because Western Precipitation *pioneered* the first COTTRELL Installation in a Paper Plant!

In the design and installation of COTTRELL Electrical Recovery equipment there is no substitute for *experience*. And it is important to remember that the Western Precipitation organization not only pioneered the first successful COTTRELL installation made in *any* industry, *but also pioneered the first* COTTRELL *installation made in the paper industry.*

This installation, made over 30 years ago, blazed the trail for use of COTTRELL equipment for recovering dust and fume from black liquor furnace gases in modern paper plant operations.

Let us show you how Western Precipitation's consistent leadership in COTTRELL "know-how" assures you the most modern advancements and the most economical operations in YOUR electrical recovery operations.

◀ *Western Precipitation knows* COTTRELL *equipment as no other organization does, having pioneered the first commercial application of* COTTRELL *equipment made in any industry!*

◀ *Western Precipitation knows* COTTRELL *applications in paper operations because its widespread experience in this field dates from the pioneer* COTTRELL *installation made in the paper industry!*

◀ *Western Precipitation is able to give you an unbiased recommendation on your recovery requirements, for in addition to leadership in the electrical recovery field—Western Precipitation also leads in the mechanical recovery field with its widely-known* MULTICLONE *Mechanical Collectors. Western Precipitation installed the first MgO plant.*

Whether *your* operations call for *electrical* recovery . . . or *mechanical* recovery . . . or *both* working in combination—Western Precipitation can design and install the type best suited to your needs—under *one* guarantee and *one* responsibility!

Write for descriptive literature on Western Precipitation products and experience.

Regardless of the size or nature of your dust or fume recovery application, let us study your requirements and make an unbiased recommendation based on over 30 years experience in the paper industry. Call, write or wire our office nearest you.

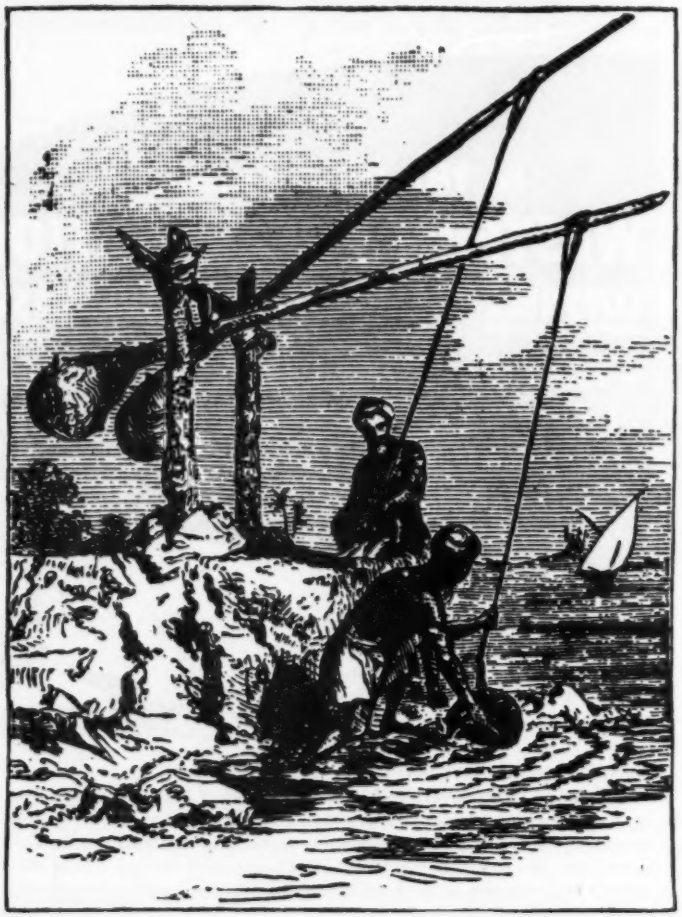
Except for its wholly-owned subsidiaries, The Precipitation Corporation of Canada and The International Precipitation Corporation, Western Precipitation Corporation is not affiliated, either directly or indirectly, with any other organization in the electrical or mechanical recovery field.

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1037 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 1 LaSALLE ST. BLDG., 1 N. La SALLE ST., CHICAGO 2 • HOBART BUILDING, SAN FRANCISCO 4, CALIFORNIA
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

The Pump that wasn't a pump



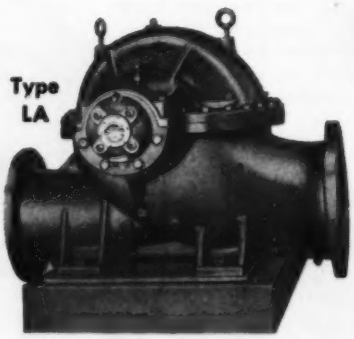
For many years this peculiar looking contrivance was the most efficient means known for moving water from one level to another—but it wasn't really a pump, it was a "shadoof".

Though still used today in many parts of the world, this hand-operated "bailing lever" is said to have been used 3000 years ago by the ancient Babylonians. On the basis of six strokes a minute, with a bucket that held 60 pounds of water, it could raise 36 gallons per minute. Those "bags" on the short end are used as counterpoises to lift the filled vessels.

If this were 3000 BC and you were looking for a pump for *any* purpose, the best Worthington could do for you would be to recommend a shadoof. The drive? Only *one* available—a husky slave.

Almost fantastic, isn't it, that crude devices like the shadoof, the mechanical innovations of their day, were the starting points for modern Worthington pumps—centrifugal pumps that can move as much as 250,000 gallons per minute; individual designs with 100,000 standard combinations of capacities, heads, casings, and mountings for *any* drive available; single-stage, multi-stage, volute, turbine, horizontal, vertical, Mixflo, Axiflo and regenerative pumps—for virtually every need of utilities, petroleum, paper, sugar, food, chemical, marine, water works, metal-working, and many other industries.

Yes, there's a Worthington pump for your requirement—a pump that's *standard* with Worthington. To find out about it, consult your nearest Worthington District Office or write to Worthington Pump and Machinery Corp., Centrifugal Pump Div., Harrison, N. J.

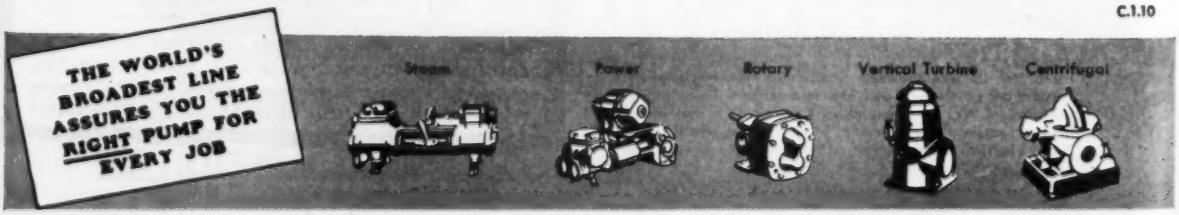


When you buy Worthington centrifugal pumps—the most complete line you'll ever find—you'll always be assured of the *right* pump for every job. Typical of this broad Worthington line is this large LA (to 60,000 gpm) at left; monobloc DN pump (to 2500 gpm), center; and the CN, frame-mounted version of the DN, in over 10,000 combinations.

WORTHINGTON

C.1.10

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB



The Paper Industry Names in the News

M. C. McDonald Elected Great Northern President

M. C. McDONALD, for the past several years president and general manager of Chesapeake Corp. of Virginia, has been elected president of Great Northern Paper Co. He succeeds William O. McKay, who becomes chairman of the executive committee.

Mr. McDonald was influential in planning and undertaking Chesapeake's postwar expansion program (see THE PAPER INDUSTRY for December). Before joining the firm in 1945, he had been associated with Brown Paper Mill Co., Inc., West Monroe, La.

Great Northern, with executive offices in Boston, is one of the major newsprint producers in the United States and operates mills at Millinocket, East Millinocket, and Madison, Me.

M. C. McDonald

D. F. Morris

DONALD F. MORRIS, Chillicothe, Ohio, has been appointed vice president in charge of operations for Mead Corp. He succeeds Howard E. Whitaker, who became executive vice president in April. Mr. Morris, vice president for procurement since 1949, will continue as executive head of the company's purchasing staff.

E. G. Bennett Made Head of Escanaba Paper Co.

E. G. BENNETT, general manager and vice president, has been elected president of Escanaba (Mich.) Paper Co. At the same time, *E. H. NIEDERAUER,* assistant manager, was made vice president.

Mr. Bennett joined the firm in 1920 as an accountant. He held successive positions as auditor, assistant treasurer, treasurer, general manager and vice president. He is to continue in the capacity of general manager. Mr. Bennett succeeds the late M. N. Smith, Escanaba banker.

Mr. Niederauer joined Mead Corp. in Chillicothe, Ohio, in 1929 as a laboratory technician. He was assigned to the Escanaba firm in 1947 as superintendent. He is to continue as assistant manager.

Changes in K-C Industrial Relations Department

Kimberly-Clark Corp., Neenah, Wis., has announced three changes in its industrial relations department.

M. H. KETTENHOFEN, who has been associated with the firm 36 years, has been named administrative assistant to the director, W. F. Cook. He is to work on an assignment basis. *H. L. WAINSCOTT* is the salary administrator and assumes responsibility for standard procedure coordination, salary administration and other activities formerly handled by Mr. Kettenhofen. *R. V. THOMS* is the new labor relations supervisor, heading up collective bargaining and other matters relating generally to union-management relations.

Personnel Changes Announced by National Production Authority

WILLIAM H. CHISHOLM, who has served as deputy director in the Pulp, Paper and Paperboard Division of NPA during the past several months, is returning to his position as vice president of Oxford Paper Co. Mr. Chisholm joined the division in May and first served as special assistant for operations. Succeeding him as deputy director is *LLEWELLYN NICOLSON,* president of D. C. Paper Mills, Washington, D.C. He joined the staff of the division in May and has served as chief of the wood pulp section.

Additional personnel changes recently announced by NPA include that of *J. PRENTIS SANGER,* assistant sales manager of Crocker, Burbank & Co., Fitchburg, Mass., who has been made special assistant for operations. *JOHN J. STEINBINDER,* assistant machine manager of Riegel Paper Co., Milford, N.J., is being loaned by his firm to serve as chief of the chemical section. He replaces Harold H. Heller of Kimberly-Clark Corp. *WILLIAM McNAIR* of the pulp division of St. Regis Paper Co. has been loaned by his firm to act as chief of the wood pulp section.

C. K. Royce Joins Vanant Products

CLINTON K. ROYCE, who recently resigned as head of the packaging section of the Navy Department's Office of Naval Material, has joined the staff of Vanant Products, Milwaukee, as technical director and assistant to the general manager. Mr. Royce, who has also served for the past five years as chairman of the technical committee on packaging, Federal Specifications Board, is a lieutenant commander in the Naval Reserve. In 1945 he received the Commendation of the Secretary of the Navy for his work in coordinating and standardizing the packaging requirements of the Army and Navy.

Bulkley, Dunton Executive Tours Far East

GEORGE G. COBEAN, president of Bulkley, Dunton Paper Co., S.A., left recently on an extensive tour of his firm's representatives in the Far East. He is to visit subsidiary companies and sales outlets in Manila, Hong Kong, and Japan.

Mr. Cobean has spent a lifetime in the export business, visiting every Latin American country, Europe, and the Orient. During the past five years he has visited South America four times and Europe three, while spending eight months in the Far East.

THOMAS B. McCABE, president of Scott Paper Co., Chester, Pa., has been elected a director of General Electric Co.

SHERMAN R. LYLE, sales engineer for the Cleveland district, has been made district manager of the Steel and Tube Division, northern Pennsylvania and

New York State district, for Timken Roller Bearing Co. His office is to be located in Buffalo.

JAMES S. ANDERSON has returned to his post as assistant general sales manager of Babcock & Wilcox Tube Co., Beaver Falls, Pa. Since April Mr. Anderson served on the staff of NPA in Washington, D.C.

Dixie Cup Co. Names Three Vice Presidents

The election of three new vice presidents was announced recently by Dixie Cup Co. Appointed to the new positions were *RICHARD W. KOCH, JOSEPH W. KUEBLER,* and *JOHN B. TAYLOR.*

Mr. Koch, a graduate of the University of Wisconsin, joined Dixie Cup in 1949 as assistant to the executive vice president. He was at one time associated with Owens-Illinois Glass Co. and National Distillers. Mr. Kuebler has been with the firm since 1927. Immediately prior to his present appointment he had been general works manager. Associated with Dixie Cup since 1922, Mr. Taylor has been controller of the company since 1944.

R. W. Koch

J. W. Kuebler

WILLIAM MAZER, executive vice president of Hudson Pulp & Paper Corp., has accepted the Greater New York chairmanship of the Muscular Dystrophy Appeal. The national fund-raising drive has as its goal $750,000.

DR. H. WYATT JOHNSTON resigned as of January 1 as vice president of Sutherland Refiner Ltd.

GEORGE WALTER has assumed the position of executive vice president of American Lace Paper Co., Milwaukee. Mr. Walter entered the industry in 1948.

J. TRACY COLBY of Albany has been elected vice president in charge of blanket and cloth sales for F. C. Huyck & Sons, Kenwood Mills, Rensselaer, N.Y. He was made director of cloth and blanket sales in 1948. Mr. Colby, who joined the firm in 1917, has been a director since 1937.

ANDREW M. McBURNEY has been appointed sales manager for Oxford Paper Co. Mr. McBurney, who formerly held the position of eastern sales manager, has been with the firm 16 years.

Ohio Boxboard Co., Rittman, Ohio, recently announced two changes in the sales organization. *S. F. ALLISON* was made sales manager and is to be succeeded as sales manager of the Container Division by *R. J. HEAMES.*

HENRY G. CHESLEY JR., an official of Wilson Paper Co., Hot Springs, Va., has been elected president of the Virginia Manufacturers Association.

American Paper Box Co. Ltd., Montreal, has nominated *L. LAWRENCE LEWIS* as a director and director of sales; *M. A. GOLDSTEIN* was nominated director and comptroller.

J. B. Taylor

W. H. Webb

W. H. WEBB has been appointed sales manager of alkali products for Detrex Corp., Detroit. He was formerly manager for the central region.

GEORGE H. SWATEK, national industrial sales manager for Scott Paper Co., appeared as guest speaker before the Advertising Club of Baltimore (Md.) November 5. He spoke on the topic, "What Makes a Salesman a Star." Chairman of the meeting was *E. BROOKS LEE JR.,* also in the industrial sales department of Scott.

TED HEIDENREICH has been appointed to the staff of the packaging division of Lily-Tulip Cup Corp.

HENRY W. STARK JR., president of Rexford Paper Co., Milwaukee, has been elected president of the Gummed Industries Association. He is the youngest man ever to hold the post and follows in the footsteps of his father, who headed the organization a number of years ago.

Miller Electric Mfg. Co. of Appleton, Wis., has announced two executive appointments. *C. BURNELL ABEL,* formerly sales manager, has been elected vice president in charge of sales; *R. A. METCALF,* former assistant sales manager, has succeeded Mr. Abel.

Sorg Paper Co., Middletown, Ohio, has announced three promotions. *CLAYTON M. BAILEY,* an accountant with the firm since 1913, has been made assistant controller; *PAUL LACKENS,* an accountant since 1918, becomes chief general accountant, and *MISS CORA MARKHAM,* a cost accountant, has been named chief cost accountant.

ARTHUR W. BARTLING of Lynn, Mass., has been named manager of product sales practices for General Electric Co's. apparatus sales division, with headquarters in Schenectady, N. Y.

JULIUS H. NILL, formerly field sales engineer in the Middle and Southern Atlantic states, has been made southern regional manager for Metallizing Engineering Co., Inc., Long Island City, N.Y. His headquarters will be at New Orleans.

R. W. K. Ulm

T. S. Markov

DR. R. W. KENNETH ULM, formerly on the staff of Fibreboard Products Inc's. Central Research Division, is now serving as technical director of the firm's San Joaquin Division pulp mill at East Antioch, Cal. *T. S. MARKOV,* formerly at Fibreboard's mills in Northern California, is presently head chemist at the Vernon (Los Angeles) Division paperboard mill.

Rayonier, Inc., has announced two executive appointments. *R. A. BUDINGTON JR.* has been named comptroller, and *M. B. HOUSTON* has been made assistant to the president. Prior to his appointment Mr. Budington was in the Boston offices of Arthur Anderson & Co., certified public accountants.

DR. RALPH T. NAZZARO has been appointed to the newly created position of director of research for Westfield Paper Co., Inc., and its subsidiary, Glassine Paper Co. Dr. Nazzaro will make his headquarters in Russell, Mass., where the firm has recently expanded its laboratory and research facilities.

Oxford Paper Co., New York, N.Y., recently announced advancements in its sales organization. *THOMAS F. NOLAN JR.,* formerly manager of the order department, has been made assistant western sales manager for Oxford and

assistant manager of sales for Oxford Miami Paper Co. His offices are to be in Chicago. *SAMUEL D. DILLON,* who has been connected with the firm's Midwestern sales operations for the past 22 years, becomes Chicago sales manager. *JOHN S. PARSONS,* a member of the Chicago sales staff, has been given additional responsibilities.

DR. ERNEST W. REID, president of Corn Products Refining Co., New York, N.Y., was recently awarded the Chemical Industries Medal. The award is made by the American Section of the Society of Chemical Industry for conspicuous service to applied chemistry. Dr. Reid joined Corn Products in 1943 as vice president in charge of the chemical and research division. He was elected a director in 1947 and president in April of this year.

J. A. QUINLAN, vice president of St. Regis Paper Co., New York, N.Y., has been reelected to a three-year term as a director of the Transportation Association of America.

RICHARD L. HUBER has been named manager of the Cleveland office of the cellulose products department of Hercules Powder Co. He has been with the firm in various capacities since 1942.

L. A. ROE has been appointed director of the mining and metallurgical section of the Bjorksten Research Laboratories, Inc., Madison, Wis. Among other duties, Mr. Roe will supervise research on the application of flotation methods to industrial waste treatment and chemical processing.

CURTIS M. HUTCHINS, Bangor, Maine, has been elected a director of Hollingsworth & Whitney Co. He is a former president of the American Pulpwood Association.

CARL R. SPADT, recently released after Army service, has rejoined the sales staff of United Board & Carton Corp., Syracuse, N.Y.

PHILIP SWARTZ has been made Pennsylvania sales and service representative for Dexter Chemical Corp., New York, N.Y.

EDWARD P. CLIFF, regional forester for the Rocky Mountain area, has been named assistant chief of the U. S. Forest Service in charge of national forest administration. Replacing Mr. Cliff at Denver will be *DONALD E. CLARK,* assistant regional forester in California.

JOHN P. HARRIS, who recently retired from the Industrial Chemical Sales Division of West Virginia Pulp & Paper Co., is now operating his own chemical sales business in Chicago. The firm handles both powdered and granular activated carbons, precipitated calcium carbonates, and filtration materials.

J. P. Harris

R. E. Olson

RAYMOND E. OLSON has been elected president of Taylor Instrument Companies, Rochester, N.Y., to succeed Lewis B. Swift, recently named chairman of the board. Mr. Olson joined the firm in 1917. In 1927 he became manager of the application engineering department and in 1944 was elected to the board of directors. In 1945 he was named general sales manager and in 1946 vice president.

National Gypsum Co. has appointed *FRANK D. DAVIS* as public relations manager to replace *DAVID A. WHITE JR.,* now on active duty with the U.S. Air Force. Mr. Davis is to be located at the Buffalo, N.Y., offices.

Continental Can Co., Paper Container Division, recently announced three appointments in the sales organization. *M. C. ALEX,* formerly manager of sales for the Pacific Division, was made director of sales. *JOHN T. TODD,* a former district sales manager, is to succeed Mr. Alex on the west coast. *HOMER B. FAILING,* division sales manager, has been given the newly created post of manager of merchandising.

JOSEPH H. LANCOR JR. has been made a director of the Transducer Division of Consolidated Engineering Corp. He will supervise and direct the design and development of transducers of various types, including vibration pickup, accelerometers, and pressure pickup.

LAWRENCE W. EGAN of Frank W. Egan & Co., Bound Brook, N.J., is in Europe consulting with customers in regard to paper converting machinery that the firm is constructing for them. He was to visit England, France, Belgium, Switzerland, and Italy.

A. G. GIBSON has been named chief engineer of Black-Clawson Co's. Hamilton (Ohio) Division. Mr. Gibson began his career with the firm at the Shartle Bros. Middletown Division as a sales engineer. He successively held the positions of plant engineer and director of export engineering until his transfer to the Hamilton Division as assistant chief engineer in 1950.

A. G. Gibson

J. H. W. Conklin

JAMES H. W. CONKLIN has been appointed general sales manager of the Philadelphia Division of Yale & Towne Mfg. Co. He succeeds *JAMES P. KINNEY,* who is taking over the Y&T distributorship in Los Angeles and southern California.

Francis H. Snyder, president of Snyder Chemical Corp., Bethel, Conn., has announced his resignation as active head of the firm. Mr. Snyder will devote full time to his consulting practice in chemical research at Newton. He will remain with Snyder Corp. in a consulting capacity.

A. Lyson has returned to his position as sales manager of T.A.B. Engineers, Inc., Chicago. He was recently released from one year of active duty in the army.

Jack H. Dollinger has been appointed sales manager of Glyco Products Co., Inc., Brooklyn, N.Y. He has been acting as assistant sales manager and technical assistant to the executive vice president since 1946.

Osgood V. Tracy has been appointed deputy director of the National Production Authority's chemical division. Mr. Tracy is on leave as general manager of the chemical products department of Esso Standard Oil Co.

James L. Bixby has been named director of public relations for Chemstrand Corp., Decatur, Ill. Prior to the appointment he was assistant director of public relations for St. Regis Paper Co., New York, N.Y.

Samuel P. Owen, advertising specialist in the portable power tool industry, has been made advertising manager of Rockwell Tools, Inc., Columbus, Ohio, manufacturer of hand saws and saw blades.

R. F. Schutz has been named assistant treasurer of the Ingersoll Products Div.

of Borg-Warner Corp. He joined Ingersoll in 1944 as controller in the division's Kalamazoo, Mich., plant.

William D. Moews has been elected vice president and general manager of Cook-Ward Box Co., Kansas City, Mo. Since the formation of the firm two years ago, Mr. Moews has been plant manager.

Worthington Pump & Machinery Corp., Harrison, N.J., has appointed two men to executive posts in its Public Works Div. *W. R. Leopold,* assistant to the vice president, has been made director of operations, and *D. L. Gallagher* has been named manager of the division.

Carl H. Rinne has been named general manager of General Electric Co's. specialty transformer and ballast department at Fort Wayne, Ind. He succeeds *William C. Wichman,* now general manager of the firm's Component Products Div.

Francis K. McCune, Schenectady, N.Y., has been appointed assistant manager of General Electric Co's. Engineering Services Div.

Allis-Chalmers Mfg. Co., Milwaukee, has announced two appointments in the general machinery division. *Malcom Jones* has been made sales representative in the Denver office, while *Robert F. Morgan* has been assigned a similar position at the Syracuse, N.Y., office.

James D. McNamara has been appointed offset technical service manager of Sigmund Ullman Co., division of Sun Chemical Corp.

Harvey E. Moore, general manager of the Belleville, Ill., plant of Eddy Paper Corp., has been nominated as a board member of the Belleville Chamber of Commerce.

George T. Humphrey Jr. has been made assistant general manager of the Service Sales Div. of Timken Roller Bearing Co. Mr. Humphrey, who leaves his post as assistant branch manager of service sales at Dallas, Tex., will be located at the firm's Canton, Ohio, headquarters.

Herbert J. Mossien has been promoted by Bausch & Lomb Optical Co., Rochester, N.Y. Mr. Mossien is now head of the analytical instrument sales department.

Wenzel A. Lindfors has been appointed sales manager of New York Belting and Packing Co. He will make his headquarters at the firm's Passaic, N.J., plant.

Hills-McCanna Co., Chicago, has announced the promotion of two company executives. *Fred R. Grassle,* secretary of the corporation, has been named assistant to the president, and *R. T. Kidde* has been appointed general sales manager of all divisions.

Howe Scale Co., Rutland, Vt., has announced the appointments of three branch managers. *O. B. Collins,* formerly with the Houston, Texas, branch, has been named manager at Atlanta. *Jack H. Brewer* is to be in charge at Minneapolis. And *Lierd E. Grant,* presently manager at San Francisco, will include the Los Angeles territory in his duties.

Morris S. Rosenthal, president of Stein, Hall & Co., Inc., New York, N.Y., was a member of the United States delegation to the United Nations Economic Commission for Asia and the Far East Regional Conference on Trade Promotion, which was to be held October 9 to 18 at Singapore.

SKF Industries, Inc., recently announced the elections of four vice presidents. *R. Robert Zisette* is in charge of sales, advertising, and market research; *Gunnar Palmgren,* engineering and research; *Eric C. Brodin,* manufacturing development, and *Karl Kesselring,* production.

Carl E. Foss, color consultant of Princeton, N.J., was recently elected a director of Macbeth Corp., Newburgh, N.Y., manufacturer of scientific apparatus and color control equipment.

Bern A. Ormsby has been made western general manager of Sigmund Ullman Co., division of Sun Chemical Corp. Mr. Ormsby, who succeeds the late Glenn O. Sensiba, has been with the firm since 1933.

Ralston B. Reid of Schenectady, N.Y., has been appointed an assistant manager of the advertising and sales promotion department of General Electric Co's. Apparatus Marketing Div. He has been associated with GE for 21 years.

Robert N. Wallis, assistant treasurer of Dennison Mfg. Co., Framingham, Mass., was recently elected a regional vice president of the Controllers Institute. He was president of the Boston Control in 1948-49.

S. L. Neely has been appointed sales manager of the San Francisco division of Eastman Tag & Label Co.

Samuel O. Sorensen, vice president of Archer-Daniels-Midland Co., has been elected a director, succeeding *Clarence M. Hardenbergh* of Minneapolis. *E. A. Olson,* vice president of the fiber division, was named to the executive committee.

W. F. Vander Mass has been named manager of the Grand Rapids district office of Allis-Chalmers Mfg. Co., General Machinery Div. He succeeds *George C. Culver,* who has asked to be relieved of managerial duties. Mr. Vander Mass has been a representative in the Grand Rapids office for the past five years.

F. Charles Ruling, former manager of General Electric Co.'s apparatus sales office in Washington, D.C., has been named manager of the Atlantic district of the Apparatus Sales Div.

Reliance Electric & Engineering Co., Cleveland, has announced the addition of four buyers to the purchasing department. The new appointees are *Nolan B. Barnard, James H. Himes, Morley Hitchcock,* and *William F. Simmonds.*

Acme Steel Co., Chicago, has recently announced two changes in the sales staff. *William G. Polley,* southern area special representative, has been made district sales manager at Atlanta. Replacing Mr. Polley is *Charles R. Lammers,* transferred from the Buffalo, N.Y., office.

Robert C. Becherer has been elected executive vice president of Link-Belt Co., with headquarters at the firm's executive offices in Chicago. Replacing Mr. Becherer as general manager of the Ewart plant in Indianapolis is *Richard E. Whinrey.*

E. Brooke Lee Jr., divisional sales manager at Baltimore, Md., for Scott Paper Co., served as chairman of the first day of the annual convention of the firm's industrial division, held October 15 and 16 at Atlantic City, N.J.

Marvin W. Swaim, first vice president and general manager of Alton Box Board Co., Alton, Ill., has been elected trustee of the Agricultural Institute.

M. L. Schwartz of United Paper Box Co., Chicago, has been elected president of the Western Division of the National Paper Box Manufacturers Association.

Spencer H. Hellekson, superintendent of the Milwaukee plant of the Paper Makers Chemical Department of Hercules Powder Co., has been transferred to the department's Savannah, Ga., plant as assistant manager. *E. Marvin Overby Jr.,* now assistant manager at Savannah, is to join the administrative staff of the Hercules naval stores plant at Brunswick, Ga. Succeeding Mr. Hellekson at Milwaukee is *Keith Martin.*

Stocked or highly specialized units

that provide the direct answer to paper and pulp mill applications

To the machinery manufacturer faced with the problem of furnishing an exchanger as a built-in component that "belongs" . . . or to the paper mill seeking the most practical solution to a processing problem involving heat transfer . . . Ross offers the direct answer.

That answer may be in the form of a more specialized type of exchanger — such as a digester circulating heater, liquor heater, liquor cooler or acid cooler — or it may be a fully standardized unit taken right out of Ross stock — for cooling lube oil in pulp refiners, calendering machines or the hydraulic fluid in control panels of paper making machines.

It makes no difference to Ross, but it *does* make a big difference to you. For Ross is the name to remember in solving *any* heat transfer problem. Here you have the extensive engineering experience and the modern manufacturing facilities that provide not only the *direct* answer, but the *most economical.*

Ross engineering representatives are available to discuss your individual needs with you and advise on the most practical means of meeting them. Write.

ROSS HEATER & MFG. CO., INC.
Division of American Radiator & Standard Sanitary Corporation
1430 West Avenue **Buffalo 13, N. Y.**
In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

ROSS

EXCHANGERS

Serving home and industry

AMERICAN-STANDARD · AMERICAN BLOWER · ACME CABINETS · CHURCH SEATS · DETROIT LUBRICATOR · KEWANEE BOILERS · ROSS HEATER · TONAWANDA IRON

The Paper Industry Necrology

Clifford W. Gaylord

Clifford W. Gaylord, 68, president of Gaylord Container Corp., died January 7 in St. Louis, Mo. Widely known in the industry, he had been associated with the firm and its predecessor for about 30 years. Mr. Gaylord was prominent in St. Louis civic and philanthropic affairs. Burial was to be at Forest Lawn in Glendale, Cal.

W. N. Wilkinson

Former president of the American Pulp & Paper Association, *Wilbur N. Wilkinson,* died recently at the home of his son, Harry H. Wilkinson, in Nanuet, N.Y.

Mr. Wilkinson was for many years sales manager of Union Sulphur Co. A member of the chemical section of the War Industries Board during the first World War, he was also chairman of the chemical division of the First Liberty Loan Drive.

Gunnar F. Magnuson

Well known in pulp and paper manufacturing circles throughout the world, *Gunnar F. Magnuson,* 67, died November 24 in Sweden. He had been managing director of A. B. Defibrator, Stockholm, since 1933. Mr. Magnuson served for a number of years as president of the Association of Pulp and Paper Engineers (of Sweden), was a fellow of the Academy of Engineering Sciences, and a member of the Technical Association of the Pulp and Paper Industry since 1923.

Arthur Temple, 57, vice president of Southern Paper Mills, Inc., Lufkin, Texas, died in Texarkana December 3. Mr. Temple was president of Temple Lumber Co., Southern Pine Lumber Co., and Temple Cotton Oil Lumber Co.

John H. Conway, production manager of the Corrugated Box Division of General Box Co., Louisville, Ky., died November 30.

Harry Lynn Galusha, 62, well known paper products salesman in Arkansas, died November 15.

John F. Segelcke, sales manager of the organic acids and plasticizers department of American Cyanamid Co.'s Industrial Chemicals Division, died December 1 at his home in Teaneck, N.J. He joined Cyanamid in 1921.

Fred K. Thompson, former owner of Gramer Force Co., Rochester, N.Y., wholesale paper firm, died November 25. He had retired from active business in 1947, when he sold the 81-year-old firm.

Howard W. Jencks, president and treasurer of Howard W. Jencks, Inc., Providence, R.I., died November 15 at the age of 80.

Philip E. Brewster, 72, retired cashier of Walker Goulard Plehn Paper Co., New York, N.Y., died November 22.

Francis J. McKee, 85, former president of Miller-Tompkins & Co., New York, N.Y., died November 18 at his home. He joined the paper bag manufacturing firm in 1890 and retired two years ago.

Raymond Stites, for 35 years pressman at Gardner Board & Carton Co., Lockland, Ohio, died November 24. He was 53.

Louis N. Aron, 81, salesman for United Paper Co. and former co-owner of Noah's Ark Store in New Orleans, died November 25.

Arthur J. Grenier, 70, retired Canadian paper box manufacturer, died November 26 at his home in Elizabeth, N.J.

Edwin P. Schnabel, 76, retired superintendent at Edwin J. Schoettle Co., Philadelphia box manufacturer, died November 22.

Charles G. Thornburgh, 62, a vice president of Rust Engineering Co., Pittsburgh, died December 5 at his home near Carnegie, Pa.

James F. Ryland, 76, of Richmond, Va., former vice president and general manager of Standard Paper Mfg. Co., died November 18. He began his career with the firm in 1903 and retired in 1949. A charter member of the Virginia Manufacturers Association, he served as president of that organization from 1932 to 1934.

Louis C. Bernstein, 59, retired owner of Union Bag Co., Philadelphia, died November 14.

Willis Charles Bergstrom, retired executive of Bergstrom Paper Co., Nina, Wis., died November 22 at his home in Montclair, N.J.

Irving N. Esleeck, 71, president of Esleek Mfg. Co. in Turner Falls, Mass., died December 6 in Greenfield. He was past president of the Boston Paper Trade Association and the Writing Paper Manufacturers Association, executive committeeman of the Associated Industries of Massachusetts, member of the National Industrial Conference Board, National Association of Manufacturers, and the Newcomen Society of England.

Robert F. Englehardt, 62, superintendent of United Board & Carton Corp's. Urbana, Ohio paper mill, died December 10 while on a hunting trip in Michigan. He had been associated with United for 25 years. In 1941 he was chairman of the New York-Canadian Division of the Superintendents Association.

Anthony A. Laria, 33, president of the New York State Council of Pulp & Paper Unions (AFL), died at his home in Utica, December 3.

Dr. James G. Vail, 65, retired president of Philadelphia Quartz Co., Philadelphia, died December 11 at New Delhi, India, where he was working at the Friends International Center for the American Friends Service Committee. An authority on soluble silicates, Dr. Vail joined Philadelphia Quartz in 1905 as a chemist. He became chemical director in 1931 and vice president in 1940.

Hadley Jones, retired box manufacturer formerly associated with Littlefield & Palmer of Nahant, Mass., died at his home September 12.

Henry Gross, a wholesale paper stock dealer in Yonkers, N.Y., died September 27 at his home.

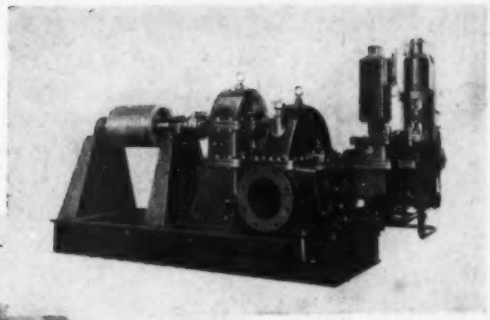
Edward Lilburn Eyre, a director of Soundview Pulp Co., died September 25 at Atherton, Cal. He is survived by a wife and two sons.

Abraham Litinsky, 64, who had been in the wholesale paper field in Minneapolis 55 years, died September 15.

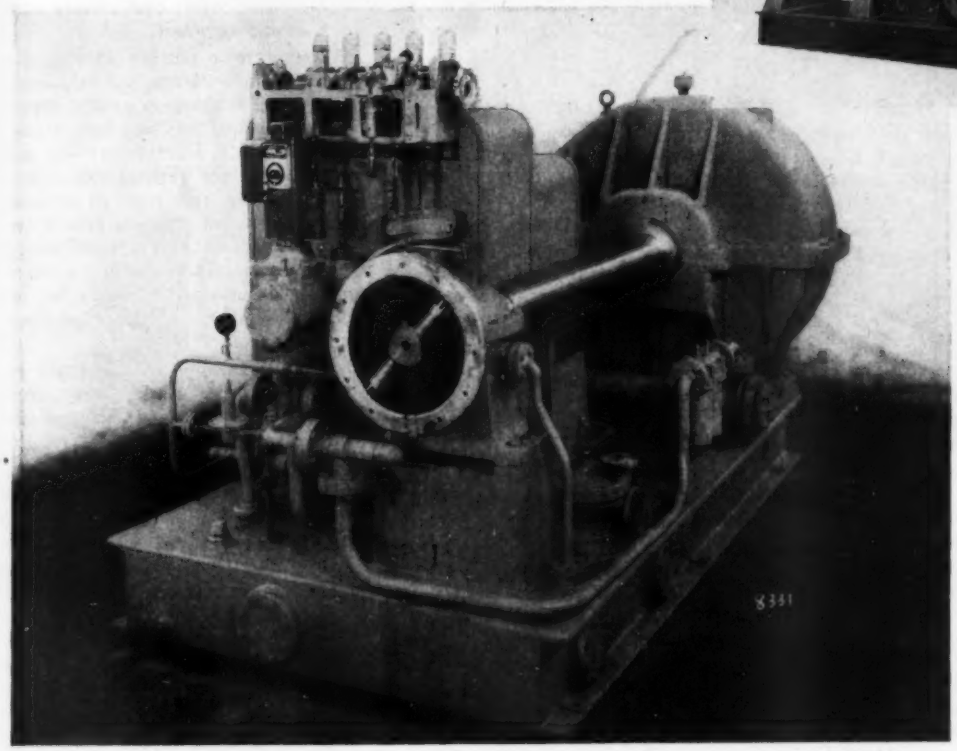
Louis Albert, 57, owner of Liberty Paper Bag Co., Detroit, died October 4.

Max Margollis, a paper merchant for 30 years, died September 26 at his home in Philadelphia.

Steady Speed



A small single-stage Worthington paper machine belted drive turbine unit.



700-hp multi-stage automatic-nozzle-control steam turbine with double extended gear shaft for driving a large paper machine.

for your paper machines with steam-turbine drive

Here's the constant-speed operation you need for your paper machines with all the cost-saving advantages of mechanical-drive steam-turbines.

You see, the sensitive speed governor on the Worthington Steam Turbine holds speed to within 1/10 of 1% above or below that for which the governor is set, regardless of any load changes that may occur during the regular operation of your paper machine.

And you can set this governor over a wide speed range to meet the requirements of any run. Remote speed controls are also available.

Worthington steam turbines can help *you* increase output and reduce breakage, while producing a better-quality paper. In addition, their smooth, efficient operation means reductions in steam costs and plant maintenance.

Engineering steam turbines for paper-machine drives is an old story at Worthington. Four different drive arrangements are available. You merely select the type drive that best suits your plant arrangements.

For further facts proving *there's more worth in Worthington*, contact your nearest Worthington office or write for the new Bulletin 1965, Worthington Pump and Machinery Corporation, Steam Turbine Division, Wellsville, N. Y.

A GREAT TEAM IN STEAM

T.1.15

The Paper Industry Safety News

Soughton Named to Head Ontario Safety Group

F. O. Soughton, service and safety supervisor for Long Lac Pulp & Paper Co. at Terrace Bay, Ont., has been elected general chairman of the northwestern branch, Ontario Pulp and Paper Makers' Safety Association. The election was held at a recent meeting of the group at Fort William.

The Association, which includes 11 paper and pulp mills in northwestern Ontario, from Marathon to Fort Frances and Kenora, was organized in 1949 to promote accident prevention.

Contest Results

A report on the 1951 contest sponsored by the group placed the Nipigon mill of Brompton Pulp & Paper Co. in first place. Long Lac was second. A. Minor served as contest chairman.

Featured during the meeting was the "Idea Clinic," whereby member mills represented held forth with accident prevention ideas or raised specific problems. The morning session was addressed by Pat Smith, the Ontario and Manitoba Council of Pulp and Paper Mill Unions. At the afternoon session, O. F. Young, editor, dealt with the subject, "An Editor Looks at Safety."

New Officers

New officers on the executive committee, in addition to Mr. Soughton, include A. E. Minor, Ontario-Minnesota Paper Co., Kenora; James Beddard, Brompton Pulp & Paper Co., Red Rock; Robert Marston, Marathon Paper Mills of Canada Ltd., Marathon, and William Lesse, Abitibi Power & Paper Co., Fort William. Alex Caldwell, Marathon, was named publicity chairman and Fred Morrish, Fort Frances, contest chairman.

Sulphate Mill Personnel Hazards Discussed at Safety Roundtable

Report of the round table discussion held by the Pulp and Paper Section of the National Safety Congress, October 10, 1951. Discussions were recorded by F. O. Soughton, service and safety supervisor, LongLac Pulp and Paper Co., Ltd., Terrace Bay, Ontario. Presiding over the session was D. V. Hill, safety director, Mead Corp., Kingsport, Tenn.

Presence of gas in Cottrell precipitators during performance of maintenance work

A number of delegates commented on this problem which appeared to be somewhat general. It was emphasized that every effort should be made to eliminate the possibility of human failure due to the fact that hydrogen sulphide and other gases were sometimes present. Specific suggestions included: (a) testing for gas by technicians; (b) use of all purpose respirators by workmen involved; (c) adequate cross-ventilation; (d) posting of guard outside precipitator when workmen are inside on any sort of work.

Hazards involved when men are working in tanks, chests and closely confined closed quarters.

There were a number of instances cited wherein workmen had been overcome while working in caustic tanks, manholes, evaporators and near evaporator hotwells. Some cases were not serious but others were, as men passed out completely and required artificial respiration. In one case, the eyes of five out of seven men were affected during the retubing of an evaporator. Lack of proper precautionary measures has resulted in fatalities. Specific suggestions included:

(a) All tanks or chests should be thoroughly purged, washed, cross ventilated and tested for fumes before workmen are permitted to enter.

(b) Individual tag lines should always be used on men entering tanks and chests.

(c) When men are working inside tanks and chests, a guard should be posted outside to assist in case an emergency develops.

(d) Respirators should always be worn by everyone in a tank or chest where there is the slightest chance of gas being present or developing.

(e) An adequate supply of low pressure fresh air should be blown into chests, tanks or confined areas. This was recommended in preference to the wearing of ventilated suits wherever possible.

Lime handling

The hazard of lime burns in the industry is apparently widespread judging by the comments of delegates from widely

SAFETY EXHIBIT sponsored by the paper industry at the 39th Annual National Safety Congress in Chicago during October. Various firms donated safety literature, posters, statistical summaries, and the like for the display

PARTICIPANTS IN THE PROGRESS OF PAPER-MAKING

Chemicals . . . produced by an industry which has made magnificent contributions to paper-making progress through applied research.

Fourdrinier Wires . . . fabricated for 56 years by Appleton Wire Works, Inc., where continuous research — directed toward making a better product—has *earned* the acknowledgment that *"Appleton Wires are Good Wires!"*

APPLETON WIRE WORKS, INCORPORATED • APPLETON, WISCONSIN

POSTERS
—A POTENT SAFETY TOOL

Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition* and *continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the 1951 Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave.

Chicago 11, Illinois

scattered geographical locations (including Canada and the "Deep South"). Obviously, the problem is accentuated by heat which causes those involved to perspire more freely, thereby increasing the slaking of any lime dust on the body. Resulting burns are often deep seated. Mills in the warmer climates, therefore, have experienced the greatest difficulty in dealing with the problem. One such mill has tried all suggestions noted below without success. Specific precautions which have worked well in many mills are listed, nevertheless, in order of their apparent effectiveness.

(a) The liberal use of vaseline on all exposed areas accompanied by immediate use of up to 5 per cent acetic acid the moment the slightest irritation is noted. In some mills individual employees are provided with a supply of both vaseline and acetic acid.

(b) Use of protective creams formulated for the purpose by manufacturers of this type of product.

(c) The liberal use of cornstarch or talcum powder, both of which will readily absorb perspiration and reduce or eliminate slaking action.

(d) The use of gauze, wrapped around parts of the body which might be rubbed by clothing impregnated with lime dust is also effective when used in conjunction with (a), (b) or (c).

Other pertinent points related to the discussion were: the need for lots of publicity regarding the hazards involved in lime handling with specific instructions related to necessary precautions rotation of men if prolonged contact with lime is necessary; early elimination from contact with lime of any employee found to be sensitive to it; the use of a medical "patch test" to determine the possibility of an allergy in borderline cases.

Opening sticking doors of railroad box cars containing pulpwood

Delegates commenting reported that their mills used mechanical types of door openers for the most part. One in particular, known as the "Come Along," was well rated. A caution was issued that some types of door openers were, in themselves, hazards and had been the cause of accidents. Employees using door openers of any type should be carefully trained in the use of the device as well as related hazards.

What precautions are necessary when cleaning inside a recovery power boiler?

This question was raised by a delegate from a mill which had an unfortunate accident wherein an employee working inside a recovery boiler was struck by a piece of falling material which dislodged from the side of the boiler after all precautions had apparently been taken.

Specific recommendations resulting from the discussion of this problem included:

(a) The use of hard hats when there is any danger whatsoever from falling material.

(b) Use of the type of clothing which will give workmen the maximum protection.

(c) Construction of a temporary overhead scaffold with some "catchall" arrangement which would give protection from falling material. (One mill uses drier belt over a scaffold for this purpose.)

Unloading 5 ft. wood

Delegates commenting on this subject came up with a number of suggestions which had proved effective in their respective mills. One mill (whose employees use pulp hooks in the unloading operation) refuses any employee the right to use a pulp hook if he has a disabling injury involving a hook which results in more than a week of lost time. Some mills insist on the wearing of leggings. Others work on the theory that it is more important to train men to respect the hazard and they, therefore, hold regular safety meetings with the men stressing the importance of caution when performing work with pulp hooks. Such efforts apparently pay real dividends. The important role of supervisors in "not easing up" on the carrying out of specific job instructions (which include the safe practices to be followed) was also emphasized.

One delegate referred to a special pulp hook design which had worked very effectively in his mill. (For information write to Sam Blackwell, Brown Paper Mill Company, Monroe, La.)

Participating in the discussions were: Sam Blackwell, Brown Paper Mill Co., Monroe, La.; George Merriman, International Paper Co., Mobile, Ala.; Carl Bellamy, Champion Paper & Fibre Co., Canton, N.C.; Gordon Lemke, Employers' Mutual Liability Insurance Co., Wausau, Wis.; C. C. Mac Pike, St. Regis Paper Co., Pensacola, Fla.; Russell Bell, Crossett Paper Mills, Crossett, Ark.; Otto Sherman, Gaylord Container Corp., Bogalusa, La.; V. H. Hanson, International Paper Co., Bastrop, La.; Otto Wagers, Champion Paper & Fibre Co., Pasadena, Tex.; John Keegan, National Container Corp., Jacksonville, Fla.; Jack Schwartz, Continental Can Co.; Julius A. Draper, Consolidated Paper Corp., Ltd., Grand Mere, Quebec, Canada.

Victor Wagner & Son,
Buffalo paper box manufacturer, was a no-lost time winner in the recent safety contest sponsored by the New York State Insurance Fund. The firm received an award at a dinner meeting in the Buffalo Hotel Statler.

NOW... old chests and tanks can be made "BETTER than NEW"

That's right! Re-line and remodel your old concrete chests and tanks with Kalamazoo Glazed Tile and they will be "better than new." Here's why.

Kalamazoo Tile will make your chests and tanks impervious to corrosion . . . keep contents much cleaner . . . keep stock flowing more efficiently. And tile is much easier to clean. What's more, you will get improved agitation to maintain more constant consistency.

Write today . . . find out how your outdated structures *plus* Kalamazoo's experience will give you *low-cost modern chests and tanks!*

Kalamazoo TANK and SILO COMPANY

TILE TANK DIVISION
127 HARRISON STREET
KALAMAZOO, MICHIGAN

Just Published!

the catalogue of testing machines for paper, textiles, metals, plastics, rubber, laboratories

it's comprehensive . . . it's illustrated . . . it's descriptive . . .

send for your free copy of catalogue 12

TESTING MACHINES, INC.
manufacturers and distributors of the finest test equipment
123 WEST 64TH STREET NEW YORK 23, N. Y.

A Sight-Flow Indicator *that Really Works*

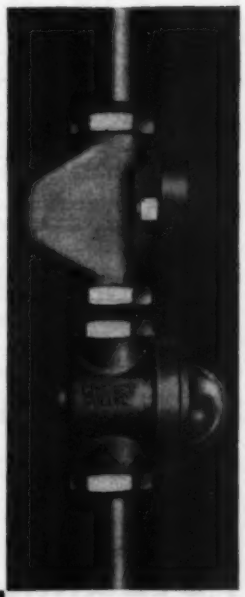
The Midwest Ball Sight-Flow is the one and only dryer condensate indicator with a "Window" that really stays clear—is constantly being scoured and kept clean by the violence of the liquid as it passes. The thousands already in use on both wet and dry end dryers prove that statement.

Flow visible from front and both sides. Installation in discharge line either vertical or horizontal.

Equip your dryers, particularly the wet end section, and keep tab on condensate flow. Add Midwest non-corrosive temperature indicator to help you spot subnormal temperatures.

Sight-Flow fitting all bronze and non-corroding. Glass ball of heavy Pyrex glass and replaceable. Assembly effective for steam pressures up to 75#. Standard pipe sizes ½", ¾", 1", 1¼", 1½". Temperature indicator also non-corroding.

Order several now and you'll order more later. They do the work or we take them back.



Midwest-Fulton Machine Company Dayton • Ohio

HANCHETT GK KNIFE GRINDER

OTHER MODELS

DN FOR LIGHT PRODUCTION CAPACITY *32" to 108"*

AK EXTRA-HEAVY DUTY

FAMOUS TRAVELING WHEEL HEAD GRINDER. Hydraulic and Mechanical Transmission Drive. Capacity 84" to 360" and longer. Speeds 10' to 100' per minute—Faster speeds if required. 3-Month Delivery in all lengths.

World's Largest Manufacturers of Knife and Shear Blade Grinders . . . Famous RED ANCHOR Grinding Wheels—Segments—Dressers—Cutters—Compound.

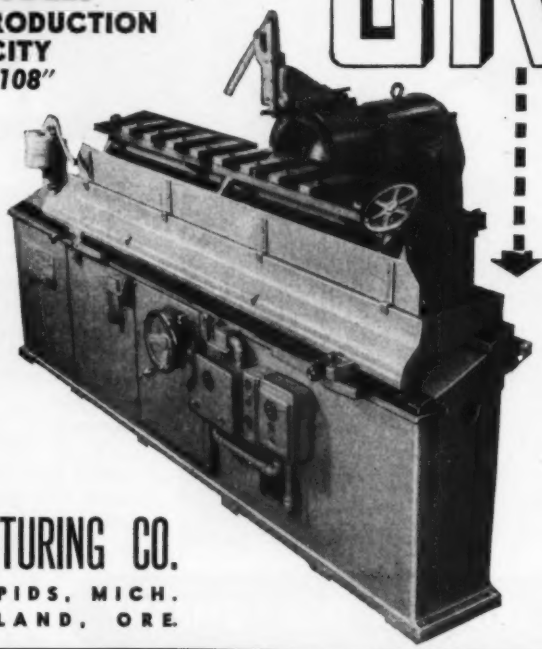


TABLE DRIVE

HYDRAULIC

ELECTRICAL

Full Automatic

SPEEDS FROM 10 to 80 FT. PER MINUTE

Faster Speeds If Required

CAPACITY 32 to 184 inches

HANCHETT MANUFACTURING CO.

Main Office: BIG RAPIDS, MICH.
West Coast: PORTLAND, ORE.

STOP VALVE LEAKAGE ON ANY FLOW!

CHEMICAL
SLURRY
LATEX
WATER
RESIN
PULP
ACID
OIL
GAS
AIR

WITH A DeZURIK Easy-Operating PLUG VALVE

DeZURIK SHOWER CO.

SARTELL, MINNESOTA

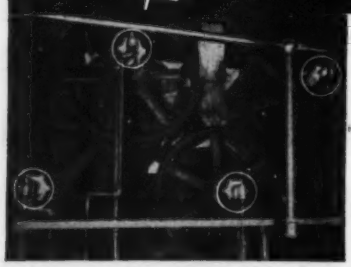
There's a DeZURIK VALVE, featuring the exclusive RUBBER-FACED PLUG, to handle virtually any service in a leak-free, trouble-free way. Complete data or demonstration on request.

(Made In Sheffield, England By Millspaugh, Ltd.)

COMPLETELY PACKLESS
SELF-LUBRICATING
SELF-ADJUSTING
SELF-ALIGNING

Only Johnson Joints offer *all* these cost-cutting, trouble-saving, production - boosting benefits. *Only* Johnson Joints end *all* the shortcomings of old style stuffing boxes, without compromise of any sort. No wonder so many hundreds of mills, and so many machinery manufacturers, have standardized on Johnson Joints. Why not find out how quickly Johnson Joints can pay their own way in your mill.

Johnson Rotary Pressure Joints



Write for catalog showing sizes and styles for all needs.

Installation in a midwestern mill — some of the 562 Johnson Joints purchased by this company.

The JOHNSON CORPORATION, 846 Wood Street, Three Rivers, Michigan

The Paper Industry Practical Shorts

Adjusting the oxy-acetylene flame

By a simple twist of a valve, you can adjust the oxy-acetylene flame so that it can be used for a wide variety of jobs in the metal-working field. It can be used for such jobs as fusion welding, braze-welding, hard-facing, cutting, as well as heating for bending, straightening and forming metals.

The three basic types of flames which make these jobs possible are the neutral flame; the excess acetylene flame, often called a carburizing or reducing flame; and the excess oxygen or oxidizing flame. The wide range of uses to which these three flames can be put make the oxy-acetylene blowpipe one of the most valuable and versatile tools in the metal working industry.

Here is how to adjust for each flame and what you can do with each type.

Fig. 1—Neutral flame. This flame has an approximate 1 to 1 ratio of oxygen and acetylene. It consists of two parts only—the inner cone, and the outer envelope.

Neutral flame

What it is: The flame is neutral when an approximate 1-to-1 mixture of oxygen and acetylene is lighted at the blowpipe tip. The term "neutral" means that the flame contains neither an excess of oxygen nor an excess of acetylene and that the effect of the flame on molten metal during welding or heating operations is chemically neutral; that is, it does not burn, oxidize or add carbon to the metal.

How to adjust for it: After adjusting the regulator valves to proper pressures (depending on nozzle requirements) open the oxygen valve on the blowpipe, ¼ turn, and open the acetylene valve one full turn. Light the blowpipe with a friction lighter. Next, open both valves wide. There will be an excess of acetylene, and the flame will have three distinct parts. (1) There will be the inner cone, a thin tongue of flame which burns with a brilliant white light. (2) Surrounding this will be an intermediate cone of whitish color known as the acetylene "feather." The length of this intermediate or excess acetylene cone varies directly with the amount of excess acetylene in the flame. (3) Surrounding both of these cones is a bluish outer envelope. By closing the acetylene valve very slowly, the whitish intermediate cone or feather can be made to grow smaller and smaller until it finally disappears completely. When it just disappears you have a neutral flame, as shown in Figure 1.

Where it is used: This flame is important for two reasons. First, it is used for fusion welding and heating operations. Second, it serves as a reference flame from which other flames are adjusted. The neutral flame is used for fusion welding such common metals as cast iron and steel; steel sheet, plate and pipe; wrought iron; chrome and chrome-nickel steels; and copper and lead. It is also used for heat-treating, and heating metals for bending, forming, and straightening.

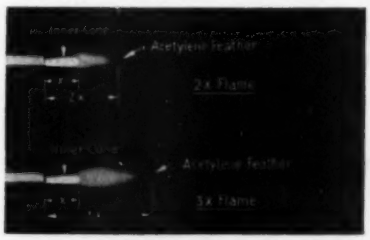


Fig 2—Excess acetylene flame. The excess amount of acetylene in this flame causes the intermediate cone or acetylene "feather." By varying the length of the "feather," excess acetylene flames for different purposes may be obtained.

Excess acetylene flame

What it is: The excess acetylene, or carburizing flame, is marked by a prominent intermediate cone or acetylene feather, as shown in Figure 2. This feather is caused by tiny unburned particles of incandescent carbon. As these particles reach the outer edge of the flame, they are burned and disappear.

How to adjust for it: First, light the blowpipe and adjust the flame to neutral. Follow the directions given above. Now increase the amount of acetylene until a feather of the proper size is obtained. Some jobs require 2x and 3x acetylene flames. This means that the acetylene feather is two or three times the length of the inner cone, as shown in Figure 2.

Where it is used: The excess acetylene flame is important because it is used for the majority of hard-facing jobs. Varying degrees of this flame are likewise used for fusion-welding such metals as high carbon steel, aluminum, nickel, Monel, and Inconel.

Fig. 3—Excess oxygen or oxidizing flame. This flame is smaller and hotter than either the neutral or excess acetylene flame. The excess amount of oxygen causes the inner cone to shorten or "neck in."

Excess oxygen flame

What it is: The excess oxygen flame can be recognized by its general resemblance to the neutral flame. (See Figure 3). However, the inner cone will be transparent and of a dark blue tinge. The cone of the excess oxygen flame will also be somewhat shorter, more sharply pointed but less clearly defined than the excess acetylene or neutral flames.

How to adjust for it: The excess oxygen, or oxidizing flame, is obtained by first adjusting to a neutral flame. Then the amount of acetylene is decreased to get an excess oxygen flame. The more excess oxygen contained in the flame, the shorter the inner cone of the flame will be.

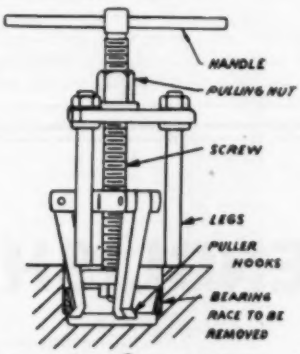
Where to use it: The excess oxygen flame is important because it is used for all bronze-welding jobs. It is used also for fusion welding manganese steel and Everdur metal. Care must be taken when using the excess oxygen flame not to oxidize or "burn" the metal. In the case of brass and bronze, the exact adjustment should be determined before welding by testing the action of the flame on the metal first.

"Slightly excess" flames

The term "slightly excess" is frequently seen in welding instructions. An operator may be directed to use either a "slightly excess" acetylene or a "slightly excess" oxygen flame to perform a certain job. In general, it means that it is better to have the flame on that particular side of the neutral flame rather than have it on the opposite. Thus, a "slightly excess" acetylene flame means one that contains a slight excess of acetylene to assure that no excess oxygen is present.—From *Linde Tips*, published by THE LINDE AIR PRODUCTS CO.

An Excellent Race Puller

This sketch shows an excellent race puller that was made by a friend of this writer's—the friend being a first class mechanic. As will be noted, there are three "legs" instead of four. With three legs the same force always falls upon each whereas with four legs that is not always true. The old-fashioned milk stool, for example, never has "seating" trouble, while a four-legged stool will usually "rock" because the ground is seldom level. Likewise, even machined parts are not always true.



Also, the sketch shows that there are three "puller hooks"—for the same reason as above.

In addition to removing races of tapered and ball bearings, this device can be adapted to remove many kinds of shafts as every mechanically minded reader will readily appreciate.—W. F. SCHAPHORST, M.E.

Foreign Abstracts . . . . . .

Cellulosic raw materials for the Indian paper industry

At present, the Indian paper industry uses as cellulosic raw materials largely bamboo and sabai grass *(Eulaliopsis binata)*. To a certain extent, waste paper, rags, and wood pulp of the bamboo species are also used. *Dendrocalamus strictus* is used to a great extent (although nine other species are listed). The author has found that chemical pulps with satisfactory strength properties have also been prepared from the following:—castor stems (*Ricinus communis*); "salai" (*Boswellia serrata*); "Jhingan" (*Lannea grandis*); paper mulberry (*Broussonetia papyrifera*); "maror phal" (*Helicteres isora*); *Cryptomeria japonica*; *Sterculia campanulata*; *Arundo donax*; *Phragmites karka*, and "panni grass" (*Vetiveria zizanioides*).

The castor stems may be pulped readily, giving easy bleaching pulps, in 40 per cent yields, and furnishing writing and printing papers. *Boswellia serrata* is found widely distributed in dry forests and gives a bleached kraft pulp in 42 per cent yield. *Lannea grandis* gives a 40 per cent yield of bleached sulphate pulp suitable for writing and printing papers. The deciduous wood of paper mulberry gave about 48.6 per cent of reasonably good bleached kraft pulp. The shrub *Helicteres isora* furnishes a bark which can be used in making bags. The wood gives an easy bleaching pulp (even when bark is not removed prior to digestion). Newsprint may be made from *Sterculia campanulata* (by admixture of 30 per cent chemical with 70 per cent mechanical pulp, both derived from this wood).

Pilot plant trials also indicate that the other cellulosic raw materials mentioned may furnish good pulps when the kraft (or soda) processes are used. In general, however, all these pulps are relatively short fibered and may demand admixture of longer fibered pulps from bamboo or sabai grass. The results were obtained in the Cellulose and Paper Branch of the Forest Research Institute at Dehra Dun. Details of the investigations are given in the *Indian Forester* and *Indian Forest Leaflets*. R. V. Bhat, *Indian Pulp and Paper*. 6 (anniversary number) 30-34 (July, 1951) (In English).

Diffuse reflection of light from paper

These two papers from the Swedish Forest Products Laboratory at Stockholm furnish a critical study of the application of Kubelka-Munk theory. The optical structure of a handmade paper sheet was analyzed. It is probable that its surface layers are less opaque than are its central parts. It was shown that the reflectance values of a multilayer sheet deviate from those of the ideal layers assumed by Kubelka and Munk in their theory for the diffuse light reflection. An ideal layer (in accordance with the K-M theory) can, however, be easily prepared by once folding the handmade sheet.

The differences between measured and calculated values of reflectivity of a handsheet are explained. Provided a proper method for determining reflectivity is used, the scattering coefficient of a hand sheet decreases with the basis weight. In a study of the unequal distribution of light absorbing properties of a sheet, the ratio of the measured to the theoretical values of the absorption coefficient was found to be less than one, thus confirming van den Akker's findings.

The influence of gloss on reflectance values was studied. The deviations caused by gloss between directional and total reflectance are partly cancelled by errors due to the substitution of absolute reflectance measurements by relative ones. The papers are, in large part, mathematical. Ake Sison Stenius. *Svensk Papperstidn.* 54, 663-709 (1951) (In English).

Parchment wrappers used for butter

The quality of parchment wrappers may have an effect on the flavor of the butter. When these wrappers contain more than three parts per million of soluble copper or more than 6 ppm soluble iron, off flavors may occur. Satisfactory wraps and various others were analyzed for water-soluble copper and iron, nitrogen, and reducing matter in the water extractives. Furthermore, certain amounts of iron and copper were added to the papers, and the amounts recovered on water extraction were determined. The authors also determined permeability of the wrappers to fat, water-resistance, acidity and the individual and combined effects of adding large and small amounts of copper and iron on the keeping quality of butter. It was found advantageous to lower the limit of soluble iron content of the papers. W. R. Mummery, F. H. McDowall, and A. K. R. McDowell. New Zealand *J. Sci. Technol. 32A*, No. 3, 1-14 (1950) through *C.A. 45*, 9267 (1951).

Sawdust in the manufacture of wallboard and other products

The author describes a new method for the utilization of short fibered materials like sawdust, shavings, *et al*, so that these can be utilized without the addition of binders in the production of wallboard, hardboard, molded board products, etc. The process involves the use of very low alkali solutions at relatively elevated temperatures. A low concentration of alkali is chosen which will cause a swelling maximum, and this swelling facilitates subsequent mechanical defi-

ENGLISH ECCO CLAYS TRADE MARK CLAYS

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

bration without further shortening of the fibers. Various figures and graphs show sawdust treated under a variety of mechanical and chemical conditions. Mill runs have also been made, and the mechanical properties of the resulting products appear to be quite comparable to those shown by groundwood. H. von Renteln. *Svensk Papperstidn.* 54, 671-678 (1951). (Original in Swedish, with English and German summaries).

Printing ink and paper smoothness

The amount of ink taken up by a paper depends upon: printing pressure; the viscosity, tinctorial power and drying time of the ink; and the absorptivity, air permeability, flexibility and smoothness of the paper. These may accelerate or retard the printing process and may cause improvement or deterioration of the print. Specifically, this article deals with the smoothness of the sheet; and reference is made to uncalendered, machine-finish, machine-glazed, dull, medium and high calendered papers and to supercalendered papers, as well.

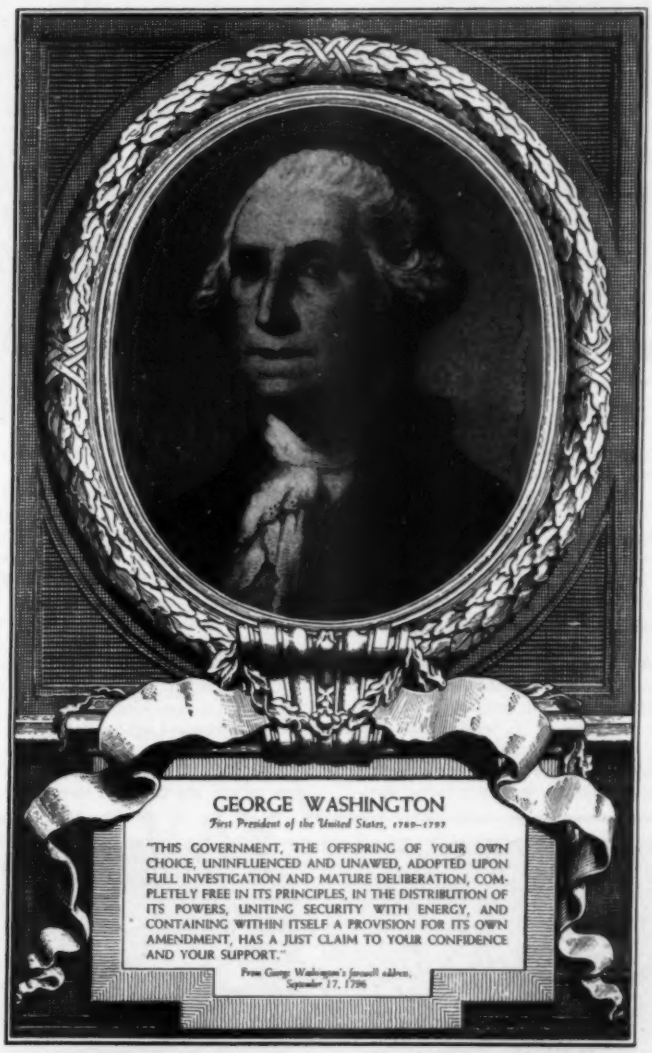
Every paper (even calendered sheets) exhibits the defect of "two-sidedness." Not only smoothness, but sizing, loading, and dyeing are influenced during manufacture; and all of these cause variations in the amount of printing ink taken up by either the wire or the felt side of the sheet. The wire side usually takes up more ink, which penetrates more deeply into the sheet than on the felt side. Thus, on machine-glazed paper, "show-through" may be noticed on the felt side, whereas no such phenomenon is manifested on the wire side. Calendered papers show different reactions. The high pressures obtained in calendering decrease the softness and flexibility of the sheet, so that ink must be transferred at high printing pressures. Even when expensive printing inks are used, these do not form a suitable bond with papers having too highly densified a structure. E. Leidl. *Allg. Papier-Rundschau* No. 15, 644 (Aug. 13, 1951) (In German).

Ultrasonic treatment of wood cellulose

This is a contribution from the Swedish Forest Products Research Laboratory, in the general field of fiber structure and pulp properties. The treatments were made with a Philips ultrasonic generator, the acoustical output of which was estimated at about 200w. The magnetostrictive unit was immersed in a water bath to prevent temperature rise.

The following "pulps" were all prepared from the same spruce wood *(Picea excelsa)*: —holocellulose, holocellulose extracted with cold 5 per cent caustic soda (and containing 90.2 per cent alpha cellulose); holocellulose cooked with 25 per cent caustic (and containing 86.2 per cent alpha cellulose); three semichemical sulphite pulps receiving various treatments (containing respectively 86.1, 88.5, and 94.5 per cent alpha); sulphite paper pulp (containing 86.5 per cent alpha); various rayon dissolving pulps (containing 89.6, 95.1, and 97 per cent alpha); an "overcooked sulphite" (containing 84.6 per cent alpha) and a kraft pulp (containing 85.7 per cent alpha). Yield figures and the percentages of "beta" and "gamma" cellulose are also given. The pulps (not dried) were disintegrated in distilled water at 0.05 per cent consistency for 1 minute with a Turmix mixer (so as not to damage the fiber materially).

Ultrasonic treatment, which is described in detail, was carried out for 30 minutes. Twenty-three photomicrographs (three of which accompany this abstract) show the effects of ultrasonic treatment. Some of the results may be summarized as follows. The fiber, in some cases, appears to form fine fibrils across its entire width. This is especially true for holocellulose. Hot alkali-refined rayon pulp shows marked surface fibrillation. One rayon pulp showed longitudinal *and* cross splitting. Holocellulose gave rise to a "slime," probably consisting of very fine fibrils. The primary wall (especially in holocellulose summerwood) becomes clearly visible, and in various cases was actually rolled back (as a constriction or "sleeve"). When holocellulose was alkali-treated, swelling (as the result of ultrasonic treatments) was relatively slight. With semichemical sulphite the degree of swelling was quite high, without too much dispersion. Sulphate-cooked semichemical sulphite shows reduced swelling, no dispersion, but surface fibrillation. Acid-hydrolyzed semichemical sulphite showed reduced swelling, some dispersion, marked fiber splitting and much slime formation. "Paper" sulphite showed a fairly high degree of


GEORGE WASHINGTON
First President of the United States, 1789–1797
"THIS GOVERNMENT, THE OFFSPRING OF YOUR OWN CHOICE, UNINFLUENCED AND UNAWED, ADOPTED UPON FULL INVESTIGATION AND MATURE DELIBERATION, COMPLETELY FREE IN ITS PRINCIPLES, IN THE DISTRIBUTION OF ITS POWERS, UNITING SECURITY WITH ENERGY, AND CONTAINING WITHIN ITSELF A PROVISION FOR ITS OWN AMENDMENT, HAS A JUST CLAIM TO YOUR CONFIDENCE AND YOUR SUPPORT."
From George Washington's farewell address, September 17, 1796

HAVE FAITH IN AMERICAN PRINCIPLES

Draper Brothers Company

Canton, Massachusetts

WOOLEN MANUFACTURERS SINCE 1856

The DRAPER Felt

Stainless Steel
MISCO PIPE and TUBES
ALLOY CASTING DIVISION, Michigan Steel Casting Company
MISCO
Heat and Corrosion Resistant Alloys
One of the World's Pioneer Producers and Distributors of Heat and Corrosion Resisting Alloys
1999 GUOIN STREET · DETROIT 7, MICHIGAN

swelling (although less than semichemical sulphite or holocellulose). Rayon sulphite and overcooked sulphite showed marked fibrillation, but the swelling could not be judged. Hot alkali-refined rayon pulp showed little swelling, no dispersion, but surface fibrillation. Cold alkali-refined rayon pulp showed an extremely low degree of swelling with little evidence of any change in general character due to ultrasonic treatment. Sulphate pulp showed only a medium degree of swelling, no dispersion, but slight surface fibrillation and little slime formation.

It is evident that ultrasonic effects break the fiber structure in its weak areas. Presumably, no glucosidic bonds are ruptured. Those pulps which are high in hemicellulose (e.g., holocellulose) swell more after ultrasonic treatment, than they do normally in water. Ballooning may occur, which is believed to be similar to that observed in cuprammonium hydroxide. Ultrasonic waves probably break the "secondary valence forces." When the hemicellulose content is reduced, e.g., by cold alkaline extraction or by further cooking, the internal swelling pressure is less, and the degree of dispersion also drops. However, (untreated) rayon and overcooked pulps exhibit a weakened structure (due to acid attack in the cook), and this results in an increased dispersion during ultrasonic treatments, despite the relatively low hemicellulose content.

In alkali-treated rayon pulps, the inherently weak structure obtains, but the internal swelling pressure is lacking. Thus, ultrasonic effects are manifest only on the surface. (Alternative explanations are also offered.) There is some evidence (according to the authors) that the hemicellulose in a kraft pulp has a lower swelling capacity than has that of sulphite pulp or native hemicellulose. All in all, the behavior of the different pulps towards ultrasonic treatment parallels the behavior in normal technical heating. William H. Algar and Hans W. Giertz. *Svensk Papperstidn.* **54**, No. 20, 693-700 (In English).

Aluminum abietates and the determination of rosin size in paper

Despite the many studies on rosin sizing, basic knowledge on the nature of the process is still lacking. In the present study the

Fig. 1 Dispersion (Semichemical sulphite)

Fig. 2 Slime (Holocellulose)

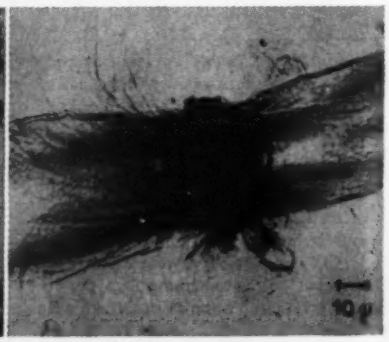


Fig. 3 Rolled up Primary Wall (Semichemical sulphite)

authors have confined themselves to model systems, each containing only a few reproducible and chemically pure components. Abietic acid was used as one model substance, and the first paper deals with the existence and isolation of two aluminum abietates, $Al(OH)_2Ab$ and $Al(OH)Ab_2$ (where Ab is the abietic acid radical).

Table I. Contact angles water-air-solid on aluminium abietates, abietic acid and rosin.

Sample films prepared from solution	Contact angles* wcons's after droplet formation			
	20 s	40 s	60 s	120 s
Abietic acid (α_D = — 104°, mp 170°)	70.9	68.3	67.2	64.6
Aluminium di-abietate	87.4	87.2	86.9	85.9
Aluminium mono-abietate	85.8	85.3	85.2	84.4
Aluminium di-abietate — abietic acid mixtures containing more than 20 mol % di-abietate[1]	86.6	86.5	86.0	85.1
American rosin, WW grade	79.5	79.6	77.6	74.3
Calcium abietate (4.89 % Ca)	71.1	68.2	67.1	64.9
Sample films spread in a molten state				
Pure abietic acid (α_D = — 104°, mp 170° C)	71.7	67.4	65.2	60.3
Oxidized abietic acid (α_D = — 80°)	63.8	60.9	59.0	53.0
American rosin, WW grade	62.2	59.3	56.7	55.8
Standard deviation of values tabulated	1.2°			

From a precipitate representing coprecipitation of $Al(OH)_2$ and monoabietate—the latter can be extracted with anhydrous chloroform. When dried, aluminum soaps are extracted with anhydrous acetone, thus the diabietate is obtained; traces of water in the acetone cause hydrolysis. The properties of these aluminum salts are described. Their solutions in organic solvents on concentration gave clear jellies and finally transparent glasses, which contained nearly the theoretical amounts of aluminum. The surface properties of sized papers may be determined by the contact angle (water-air-solid) of the sizing substance. This contact angle was measured for aluminum abietate, abietic acid and rosin, and results were obtained which have a bearing on sizing process. Measurements were made at 20C. and 65 per cent relative humidity using a horizontal microscope. The light from the microscope lamp was filtered through an infrared filter, and a 0.8 mm. diaphragm was attached to the objective of the microscope to give a sufficient depth of focus to show a sharp boundary at the liquid-solid interface. Droplets containing 0.003 milliliters of water were spread on the solid surfaces with a micrometer syringe and were then photographed after 20, 40, 60 and 120 seconds of contact. The solid surfaces were obtained by evaporating chloroform solutions of appropriate substances (or mixtures) on a glass slide or (in a few instances) by spraying the melted component on the slide. Contact angles were then calculated from the altitude and the base diameter of the droplet (neglecting the effect of gravity). Contact angles of mixtures of the aluminum diabietate and abietic acid (in varying molar percentages) are shown in the figure. Table I gives various contact angles.

Table II. Comparison between the TAPPI T 408 m-46 Method and the Chloroform Extraction Method.

Paper type	Sized with %: Dalthrine[1]	Sized with %: Breoid[2]	Rosin size in % on dry paper: According to TAPPI method T 408 m-46	According to Chloroform extraction method: Uncorrected	According to Chloroform extraction method: Corrected for alumina
1. Rag paper		1.0	0.57 0.25	0.53 0.55	0.42 0.43
2. Writing paper	2.4	0.8	4.00 3.74	4.29 4.24	4.16 4.11
3. Writing paper	3.2		4.44 4.15	4.13 4.13	4.01 4.01
4. Writing paper		2.3	3.02 2.78	2.92 2.90	2.87 2.85
5. Filler sheet	3.0		3.40 3.56	3.94 3.97	3.81 3.84
6. Coated paper		1.1	0.67 0.67	0.70 0.70	0.69 0.69
7. Coated paper	Unknown		0.56 0.56	0.48 0.45	0.48 0.45
8. Coated lined board	Unknown		2.73 2.75	3.18 3.24	3.12 3.18
9. Linters + bleached sulfite	Unsized		0.25	0.37	
Standard deviation calc. from duplicates 1—8			3.5 %	1.5 %	

[1] Fully saponfied rosin size.
[2] High-free rosin size.

In a second paper, a new (and more reliable) method is described for determining rosin size in paper. The technique depends on the solubility of aluminum resinates in chloroform. Inasmuch as there is a relation between the degree of saponification of the size and the amount of rosin-bound-aluminum in the coprecipitate, it is possible to determine the degree of saponifiation of a rosin size. The chloroform extracts (results of 20 siphonings in a Soxhlet extractor) are partially evaporated, filtered, evaporated to dryness and heated seven hours at 105F. (The optimum drying time was determined by making a drying study on aluminum

Need
Paper Making Chemicals ?
See Solvay First!

QUESTION: Who offers an *exclusive* type of Technical Service for the paper industry?

ANSWER: SOLVAY offers a specialized paper makers' Technical Service manned by skilled technicians who are *experts in the paper field.*

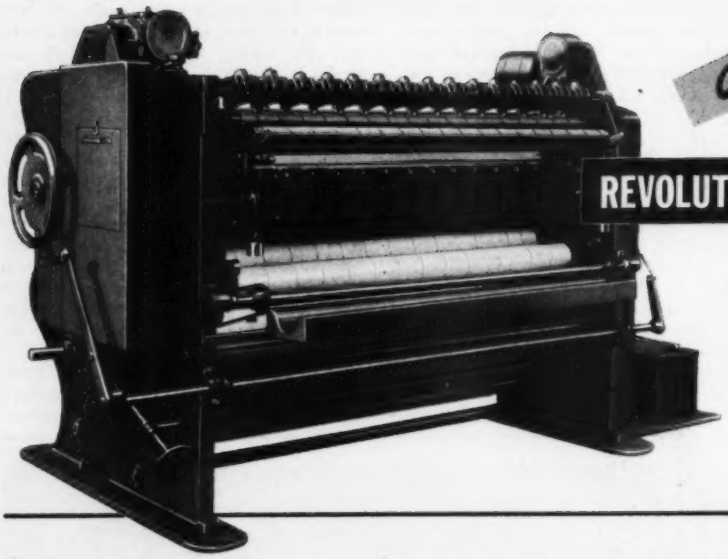
QUESTION: Who has a group of strategically located manufacturing plants, plus a coast-to-coast chain of warehouses and stock points in paper-making areas?

ANSWER: SOLVAY!

QUESTION: Which alkali manufacturer has served the paper-making industry over the longest period of time . . . and has accumulated more experience in the production of these vital paper-making chemicals?

ANSWER: SOLVAY of course!

SOLVAY
REG. U. S. PAT. OFF.
SODA ASH
CAUSTIC SODA
LIQUID CHLORINE
SOLVAY Alkalies Chemicals Since 1881
SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.



Cuts Perforates Slits

REVOLUTIONARY, NEW ROLL WINDER

Counts Automatically

WITH 25-50% GREATER PRODUCTION SPEED

• SHARP, CLEAN EDGES
• NO LINT OR FUZZ
• 100% ACCURATE COUNT

THERE'S no lost motion with the 60-B new, *continuous* toilet roll winder. Operator simply places uncut core on shaft at number one station and removes completed rolls which have been cut, perforated and accurately sheet counted, from the number two station. After displacing rolls, operation is repeated. Each full cycle produces a minimum of 10 standard 4½" rolls on a 45" machine or 18 similar rolls on an 81" machine. Winder is also designed for roll towel and other paper products production. Simplified mechanical operation assures smooth running with a minimum of wear on all running parts. This same steady, even motion produces rolls of uniform appearance and bulk. Write for further information and complete specifications.

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS
Manufacturers of
Printers, Embossers, Folders, Interfolders, Waxers, Laminators, Wrapping Machines, Core Winders, Packaging Presses, Crepers and Napkins, Toilet Tissue and Paper Towel Units.

abietate). The weighed extract was then corrected for alumina after ashing at 1200C. (An equation for such corrections is given.) Table II gives a comparison of the results

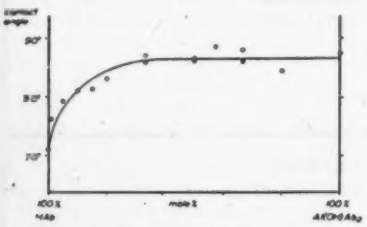


Fig. 1. Contact angles water-air-solid (20 secs after droplet application) on mixtures of aluminium di-abietate and abietic acid.

obtained with Tappi T 408m-46 method and those using the newer procedure. The author believes that of the two, the latter is the more reproducible. First paper—Ernst Back and Börje Steenberg, *Svensk Papperstid,* 54, 510-15 (1951); Second paper E. Back, *Ibid,* 516-20 (1951) (Both articles are in English).

Testing the suitability of paper for specific uses

Only recently have testing procedures been devised to show the suitability of a paper for some specific use. In the older tests there was a lack of correlation between the data obtained and actual use requirements. Thus, the author discusses the differences between "breaking load" and "breaking stress." Recently dynamic strength testing, rather than static testing, is finding favor. The author also points out the difference between the term "sizing" and "size resistance." As to the absorptivity of a paper, the liquid to be absorbed should always be listed, inasmuch as absorptivity for different liquids is far from identical. Similarly, the type of ink (used in printing) should be specified. When papers are to be printed, ink absorptivity is not the only factor to be considered. The quality of the print job also depends on "deformations" to which the ink is subjected during its transfer to the paper surface, and these (deformations) will be influenced by ink consistency, rate of ink absorption, *et al.* Uniformity of such absorption is also important. Inasmuch as coated papers show a more homogeneous surface, they are superior to uncoated, supercalandered sheets in insuring uniformity of ink absorption. Experimental printing presses should give the best summative data about the printing quality of a specific paper, but the application of such presses may be complicated and cannot be used for simple mill control purposes. Julius Bekk. *Allg. Papier-Rundschau, No. 12,* 505-6 (1951) (In German).

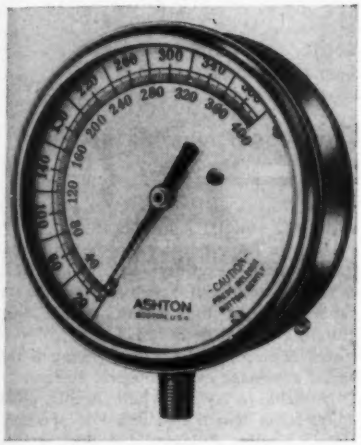
Accuracy of Schopper folding measurements

Folding endurance tests with various Schopper instruments showed serious discrepancies, and the authors found that there was a lack of knowledge regarding permissible tolerances in the standard German method. In consequence, the performances of twenty-three such folding testers were evaluated, using five standard paper samples, which were known to have very different folding endurance properties. In every instance, ten tests were made—each in the machine and cross-machine directions. The authors supplied details for statistical evaluation of their data, and it was shown that in the calibration of the instruments the accuracy indicated was only ± 34 per cent, which thus became the tolerance limits. It was urged that an instrument of far superior performance (i.e., with a deviation of well under ± 34 per cent) would be kept solely for purposes of calibration, either for evaluating the performances of other Schopper folding testers or for periodically checking standard paper samples, and that new testers should also be tested with the standard samples. W. Brecht and L. Körner. *Das Papier 5,* 155-61 (1951) (In German).

The "feel" (griffigheit) of paper

The author attempted to find a more objective method of evaluation of the practical papermakers "feel" (*I*) of various papers by determining their basis weight, stiffness and folding endurance (in the machine and crossmachine direction), smoothness, and fiber composition, and correlating these with *I*. In general, papers having a satisfactory *I* had relatively low density, high stiffness, high folding endurance, and relatively low smoothness. Frequently, papers with good *I* contained rag stock. Comprehensive tabulated data are discussed fully. Wilhelm Kilpper. *Wochbl. Papierfabr.,* 79, 288, 290, 292, 294 (1951) (In German).

The Paper Industry New Products



Paper tester gage

The Ashton 96A gage which measures the bursting strength of paper is used on the Mullen or Cady-type testers. It is distinguished by the push-button mechanism which smoothly and positively returns the pointer to the zero mark after each measurement. For continuous use in production testing, spot testing from hand sheets and in the laboratory, this gage allows for rapid consecutive burst on paper, chipboard or corrugated.

Available in 3-inch dial size to 120 lb. and 4½-inch dial size to 1000 lb. For pressures up to 5000 lb., a 6-inch dial steel tube gage is available on special order. Test gage accuracy of ½ of 1 per cent is maintained on all paper tester gages. *Ashton Valve Co., First & Binney Sts., Cambridge, Mass.*

Polyamide resins

A series of new compounds has been added to General Mills' line of heat-sealing polyamide resins. They are code named polyamide resins #90, #90S, #93S, #95S and #100S and may be used alone or as modifiers for other resinous products.

Polyamide resin #90 is a hard, tough and brittle resin made by the copolymerization of di- and tri-linoleic acid and other acids with ethylene diamine. It has better solvent resistance than previous polyamide resins and a higher melting point (185C. as compared with 105C.).

Adding a small amount of antioxidant to polyamide resin #90 or to the other polyamides produces the stabilized products designated as #90S, #93S, #94S and #95S. At high temperatures, these stabilized resins have a gel time approximately 3 times longer than have the standard polyamides.

Polyamide resin #100S is a soft, tacky, plasticizing type of resin. It is made by the condensation of dimerized and trimerized unsaturated vegetable oil fatty acids with diethylene triamine. It is said to have unusual adhesive properties, particularly for non-porous surfaces. Because it is compatible with a wider range of materials than are other polyamides, it is a potential plasticizer for resinous products. *General Mills Research Laboratories, 2010 East Hennepin Ave., Minneapolis 13, Minn.*

Welding fittings and joint

Welding fittings and joint for corrosion-resistant coated piping are now being manufactured. These new fittings and joint eliminate failures which occur at the joints due to vibration, expansion, and contraction, when mechanical-type joints are used. Turbulence, a prime cause of failure in many types of corrosion-resistant piping, is eliminated because Welstrom fittings have an internal diameter identical with the pipe.

These corrosion-resistant coated fittings and joints are available in all standard sizes and types from ½ to 30 in. in diameter. Any alterations which are necessary for field assembly, resulting from slight changes in design layouts, can readily be made in the field. *Welstrom, Fifth St. and North Ford Blvd., Hamilton, Ohio.*

Redesigned master switch

A redesigned master switch, featuring a new cast-aluminum cover and up to five adjustable stops, which provide for any combination of from one to five points of movement of the operating handle in either clockwise or counterclockwise direction, is now available.

For heavy-duty installations, the dustproof switch will find application on large materials handling equipment. The new alumi-

One of the Men Behind Eastwood Wires

Patrick Edward Daley

"Ambassador" to NEW JERSEY — PENNSYLVANIA — DELAWARE
MARYLAND — VIRGINIA — OHIO

You know him better as "Pat" Daley, one of our able field men. Though his territory is defined, there are no limits on his wide friendship, his unfailing good nature or his knowledge of the paper field — the last acquired through service in mills that belong in the paper industry's "Who's Who", including production of ground wood specialties, kraft and bag papers, newsprint and other specialties. His long experience in supervisory capacities in both large and small mills has helped us to serve the paper industry better since he joined us in 1935. We are happy to acknowledge his valuable services.

EASTWOOD-NEALLEY CORPORATION • Belleville, N. J.

num cover, which weighs only one-third as much as the former cast-iron cover, is easy to remove and offers good protection from accidental blows.

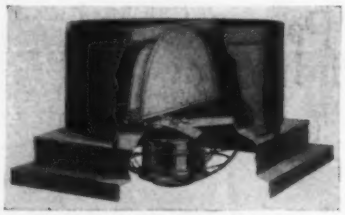
Standard equipment includes a ball and rod handle, but four other types of operator are also available. The new switch is interchangeable in size and mounting with former G-E types, and all wearing parts are the same, simplifying parts replacement. It measures 13 in. wide, 10 in. deep and 14 in. high, with the handle in a vertical position. *General Electric Co., Control Dept., Schenectady 5, N.Y.*

pH indicator

A newly developed, line-operated pH indicator and vacuum tube voltmeter is unaffected by normal fluctuations in line voltage or by zero drift of the amplifier. A converter-type instrument, its circuit employs DC to AC conversion, AC amplification, and conversion back to DC for voltage feedback. Conversion stabilizes zero; feedback stabilizes gain.

Used as a pH indicator, the instrument reads directly in pH and makes glass electrode measurements to within ± 0.02 pH on grounded or ungrounded solutions. Continuous pH 0 to 14 scale eliminates range-changing. For manual lab use, temperature compensator is graduated from 0 to 100 C. in 2 degree divisions. If the instrument is used as a continuous indicator on industrial process pH, automatic temperature compensation can be provided.

As a vacuum tube voltmeter, the new indicator can be used with any high or low impedance electrode system which develops potentials within range of the instrument. *Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.*



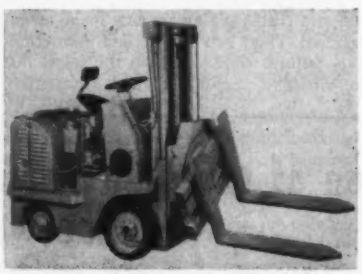
Powered roof ventilator

A new "straight-through" type powered roof ventilator features simplified design and low over-all height without sacrificing efficiency. The ventilator is "open" only when its propeller fan is operating, the air stream being utilized to open and hold two semi-circular halves of the damper while forcing unwanted elements out of the building. A streamlined fan ring directly above the square-tipped blade propeller guides the airstream smoothly without backflow. Given the trade name "Whirlout," the new unit is supplied in a wide range of sizes and capacities. It is completely weatherproof. These ventilators are described in a new bulletin, No. 346. *The Swartwout Co., Cleveland, Ohio.*

Small submersible pump

The BJ "Subette" pump is a small submersible pump designed for small capacities, 30 to 130 gpm, at high heads, 80 to 770 ft., from wells of 6 inches inside diameter or larger. The motors, available in sizes of 5, 7½, 10 and 15 hp, are oil-filled, mechanically sealed, and capable of operating completely submerged in water.

This submersible unit eliminates the alignment and bearing protection problems of shaft-type installations, reduces number of moving parts to a minimum, and eliminates field adjustments because of precision factory assembly. *Byron Jackson Co., P. O. Box 2017 Terminal Annex, Los Angeles 54, Calif.*



Rollover-clamp

The rollover-clamp, designed for installation on 4000-lb. capacity Baker fork trucks, makes it easy to handle pallet loads of material on the forks, dump skid boxes with the rotating head and use the forks as clamps for handling miscellaneous objects. A 4000-lb. fork truck outfitted with the rollover-clamp will handle loads up to 2400 lb., 48 in. long. *The Baker-Raulang Co., Industrial Truck Div., 1250 W. 80th St., Cleveland 2, Ohio.*

Wax for carbon paper

Parwax, a new, low-cost domestic product similar to imported Carnauba, is now on the market. In standard wax-oil mixes, it registers a melting point and viscosity index which compare closely with those of imported Carnauba. Gloss readings for Parwax mixes are higher than those for Carnauba mixes, indicating that Parwax is capable of producing a shiny polish without buffing.

Because of its low cost, Parwax is particularly suitable for use in single-use, "throw-away" duplicating papers, as well as regular multi-use carbon papers. Parwax is also used in new formulations for a number of other wax-containing products, including solvent polishes. It is free of all resins, natural or synthetic. *Concord Chemical Co., Moorestown, N. J.*

Lightweight metallic acetate

Metallized acetates are now available in lighter weights in a range of eight colors as a result of the development of a 100-gauge metallized material (.001 thickness).

Used for many purposes in sheeting form because of its flexibility and pliability, this metallic acetate can also be laminated to paper and board thus providing even more glittering effects than foils. The color is coated underneath the acetate giving it the added advantage of a protective surface.

Available in 20-inch widths in rolls up to 2,000 ft. in length or sheeted to specifications. *Coating Products, 136 West 21 St., New York City.*

Hydraulic pump

The Hydropulse, a new high-pressure, positive displacement hydraulic pump with homogenization valve has many advantages over ordinary types of hydraulic pumps. It is leakproof, self-priming, and foolproof in operation. The pump requires no water or sewer connections and may be run dry without damage. The unit can be

NOW READY

The completely revised, greatly extended

1952

PAPER MAKERS' AND MERCHANTS' DIRECTORY OF ALL NATIONS

Contains summaries of nearly 5,000 Paper, Pulp & Board Mills in more than 50 countries, with Makes of Paper, Number and Widths of Machines, Tonnage Output, Power Used, Stations for Goods, Classified Lists of Products, etc.; *British and Overseas* Agents, Mill Representatives, Paper Merchants, Wholesale & Manufacturing Stationers and Equipment Suppliers; *British* Paper Stainers, Converters, Waste Paper Merchants, Rag Merchants & Paper Stock Dealers, Cardboard, Carton & Paper Box Manufacturers, Paper Bag Makers, China Clay Producers & Merchants. Also: Trade Associations, Tables of Weights & Sizes, Trade Customs and Buyers' Guide.

Supplies Limited: Order NOW

—advance orders have absorbed the greater part of the limited edition, and orders for the few remaining copies are being filled in rotation.

Fill In and Mail To-day

BUSINESS PUBLICATIONS LTD.
180 Fleet Street, London, E.C. 4, England

Please send us by return one copy of the 1952 PAPER MAKERS' & MERCHANTS' DIRECTORY OF ALL NATIONS, for which we enclose remittance for $6.50.

Name.....

Address.....

.....

.....PI/PD

REBUILT AND NEW

GUARANTEED MOTORS

M.G. SETS • GENERATORS

Hoists • Compressors • Transformers
Units of Every Size and Description

WE'LL SELL, BUY OR TRADE

CHICAGO Electric Co.

1323 W. CERMAK ROAD
CHICAGO 8, ILL.

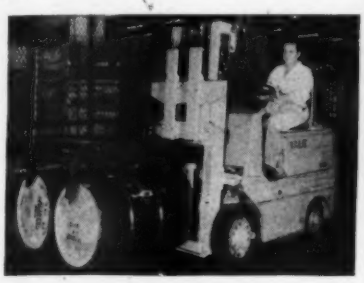
MILL COGS

We make a specialty of "Ready Dressed" cogs which are READY TO RUN the moment driven and keyed. Write for circular "O" and instruction sheets free.

The N. P. BOWSHER Co., South Bend, Ind.

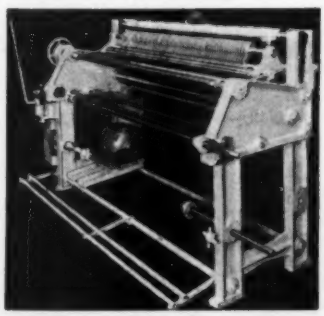
taken apart, cleaned, and put together in ten minutes. There is complete isolation of the material being processed and the actuating mechanism. The power bill is approximately one-third less and maintenance costs are practically negligible, since there are no cylinders to score or pistons or packings to wear.

This hydraulic pump is available in four sizes from 0.5 to 2.5 gpm and for pressures up to 3000 psi. *Scott & Williams, Inc., Pioneer Div., Empire State Building, 350 Fifth Ave., New York 1, N.Y.*



Drum handling device

A new automatic horizontal drum handling device that can be attached to any industrial fork truck without removing the forks or making any hydraulic or mechanical connections is now available. It is a self-contained unit that fits over the forks and is fixed to them with two screw-type clamps. One or two standard drums can be picked up. Loads will not drop with sudden stops when traveling over a rough surface or when truck channels are tilted. *Yale & Towne Manufacturing Co., Philadelphia Div., 11000 Roosevelt Blvd., Philadelphia 15, Pa.*



Single rewind-slitter

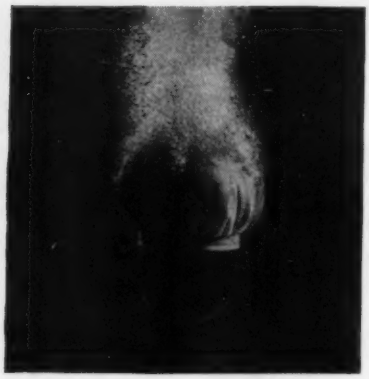
A versatile, fast-operating combination slitter-rewinder which operates on a single shaft without interleaving or fusing is now on the market.

This precision-engineered, single rewind-slitter, with speeds up to 700 ft. per minute, operates with either razor blades or rotary cutters against a hardened steel roll. It is ideal for slitting rubber, cellophane, paper, gummed paper, pliofilm, cloth, polyethlene, acetates and plastic (2 to 40 Ga.). Its manufacturer claims it is the only slitter-rewinder of its kind on the market that cuts both plastic and cellophane. It will slit materials into rolls as narrow as ½ inch. An extension of the supply shaft, which is non-removable and connected with a universal joint, makes it possible for one man to load and operate.

The machine, which has all sealed ball

K
ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES
One Moving Element. Non-pulsating Vacuum.
No Internal Parts In Wearing Contact. No Internal Lubrication. Handles Liquid With Air.
No Expert Attendance. Constant Efficiency.
Low Maintenance Cost.
Plus-
K
NASH ENGINEERING COMPANY
411 WILSON AVE., SO. NORWALK, CONN

bearings, comes fully equipped with motor, gear sprocket and chain drive, ready for operation. There are 14 models of various sizes available. *Center Tool Manufacturing Co., 2707 West Van Buren St., Chicago 12, Ill.*



Collapsible air diffuser

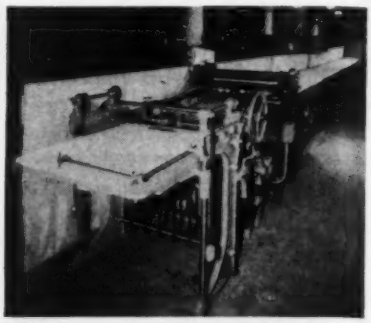
The Colaflex Diffuser, a new type of equipment for fine diffusion of air or other gas into a liquid in sewage and industrial waste treatment, water conditioning, biological manufacturing processes and absorption processes, has recently been announced.

An important feature is the ease with which the flexible fabric diffusing elements can be cleaned and their permeability maintained. Operation of a three-way valve shuts off air or gas pressure, and liquid pressure then inverts the element down into its receptacle. This flexing of the fabric dislodges solid particles that may have accumulated on or in the fabric, keeping it clean and permeable.

The Diffuser is readily adaptable to many different types of installations. Several diffuser elements can be connected to a common gas duct or header of any desired pattern within the tank in which the liquid is contained. *Infilco Inc., Box 5033, Tucson, Ariz.*

Paper roll grab attachment

A revolving paper roll grab attachment which will handle large type rolls of newsprint and other similar loads, ranging in diameter from 22 to 44 inches, is now available for the Hyster Model "40" Lift Truck. Other new features of the attachment are: increase in clamping force and surface, permitting the handling of both slick and newsprint paper; removable bumper guard, providing more convenient access for maintenance and servicing of the unit; automatic check valve which maintains the applied clamping pressure until the load is released by the operator. *Hyster Co., 2902 N.E. Clackamas St., Portland 8, Ore.*



Conveyor gluer

Paper of all weights up to three-ply index and from 6 in. x 6 in. to 28 in. x 36 in. sheets can be stripped or solid glued automatically on the Potdevin conveyor gluer. Sheets are fed automatically and delivered glue side up on an endless belt conveyor. Forced drying equipment can be installed, if required, as well as a suction conveyor for thin sheets. The machine has a variable speed control up to 3,000 sheets per hour and can use any kind of glue. For hot glues, a thermostatically controlled glue pot can be furnished. The suction pile feeder is equipped with sidewise register control for perfect regis-

Lindsay Fourdrinier Wires *are babied* throughout their manufacture!

Annealing, of paramount importance to quality, can make or break (literally) Fourdrinier wire cloth. Year after year, Lindsay spends more and more freely in perfecting these facilities.

The Lindsay Wire Weaving Company
14001-14299 Aspinwall Ave., Cleveland 10, O.

Lindsay WIRES
FOR PAPER MILLS

Mack
POLE TYPE
LOGGING DOLLIES
For heavy duty. Also furnished with tandem axles. Welded Steel construction.

Mack

★

Ask about Mack Grapples and Mack Log and Pole Tongs, for safe handling of all timber products.

MACK WELDING COMPANY
Manufacturers
9212 Grand Ave. Place DULUTH 8, MINNESOTA

SULPHITE MILL ACID PLANTS
Sulphur Burning Plants • Jenssen Two Tower Acid Systems • Gas Coolers—Surface and Spray Type • Jenssen Pressure Acid Systems • Jenssen Auxiliary Process Towers • Recovery Plants—Cooking Acid
SOLUBLE BASE ACID PLANTS
SEMI CHEMICAL PLANTS
JENSSEN SO_2 ABSORPTION SYSTEMS
FOR BLEACH PLANT APPLICATION
SULPHUROUS ACID PREPARATION
G. D. JENSSEN CO., INC.
WATERTOWN, NEW YORK
WESTERN REPRESENTATIVE:
JAMES BRINKLEY COMPANY, Seattle, Washington
FOUNDED 1915

Nearly 700 Jones High-Speed Refiners had been sold* when we introduced the FIBREMASTER—a refiner especially designed and built for mills requiring the unique features of the smaller machine, but much higher capacity.

The FIBREMASTER is the "big brother" of the High-Speed Refiner . . . duplicates its improved stock control, its flexibility, operating and maintenance economy, its versatility — but with a capacity of at least twice the tonnage.

For high-quality, high-tonnage refining, ask your Jones representative about the FIBREMASTER . . . or write us direct.

*942 as of May 1, 1951

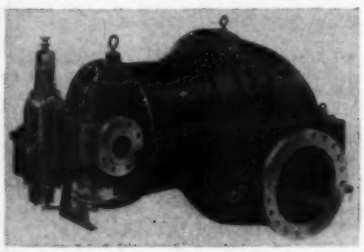
E D Jones

FIBREMASTER®

E. D. JONES and SONS COMPANY • PITTSFIELD, MASSACHUSETTS

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

tration of glue. Over-all dimensions are 5 ft. wide by 16½ ft. long. The conveyor belt can be supplied to any length desired. Illustration shows the machine equipped with a 40-ft. working surface conveyor. *Potdevin Machine Co., 1285 Thirty-eight St., Brooklyn 18, N.Y.*



Mechanical-drive steam turbine

Multi-stage, mechanical-drive turbines in ratings from 200- to 5,000 hp. have been designed to cover a wide range of industrial applications, as well as for power generation purposes. There are four of these new units designated as types DP, DR, DRV, and DRVX. Type DP is designed for driving pumps, compressors, fans, blowers and similar equipment. Type DR is built for applications requiring wider speed range, greater accuracy of control, and greater capacity than can be obtained from type DP turbine. Type DRV has the governing characteristics of the DR multi-stage turbine, but whereas the DR unit employs a single governor controlled valve, the DRV utilizes automatic sectional valves linked to the oil relay governor. The fourth type, DRVX, is designed for applications where process steam is desired at a definite, steady pressure. *General Electric, Schenectady 5, N.Y.*

New Products Briefs . . .

ACRYLON ACRYLIC RUBBERS—Acrylon BA-12 shows good low-temperature characteristics and is also resistant to heat, hot oils, boiling water, oxygen, ozone and sunlight. Acrylon EA-5 has somewhat less low-temperature flexibility but increased oil resistance. Both rubbers are resistant to flex cracking. *American Monomer Corp., Leominster, Mass.*

PLATFORM ADAPTER is designed to convert Towmotor Model "W" Electric Pallet Trucks into platform trucks. Height of forks with adapter is 7 inches in lowered position; 11 inches, raised. Available in lengths to match standard pallet truck forks up to 72 inches long. *Towmotor Corp., 1226 East 152nd St., Cleveland 10, Ohio.*

REVERSING DRUM SWITCH—Small, simply designed for machines and equipment requiring an economical across-the-line starting and reversing switch for a-c d-c motors rated at two hp. or less. Typical applications include drilling machines, lathes, milling machines, and laboratory equipment. *Allen-Bradley Co., Milwaukee, Wis.*

UNIVERSAL DEPTH GAGE—Simplicity and inherent accuracy are two characteristics of this gage. It allows the measurement of depths, lengths, angles, or steps to tolerances as fine as .00005 in. anywhere in a three inch length. *Saart, Kraemer & Hanscom, Inc., 1 Washington Ave., Providence, R.I.*

INSULATION TEST UNIT—The TAKK high voltage DC insulation tester is manufactured for ranges of 0 — 15 K.V., 30 K.V., 45 K.V. and 75 K.V. This portable unit will detect insulation weaknesses on all types of high voltage equipment before breakdowns can occur. It will test above or below the full operating voltage of the equipment being tested and will not impair the value of the insulation as a result of the test. *The John Hewson Co., 106 Water St., New York 5, N.Y.*

STEERING AXLE—An Elliott-type steering axle, designed for improved operating efficiency, is a new feature on the Yardlift-60 Fork-Lift Truck. Torsional rubber bushings are used at both pivot mount points to absorb shocks that otherwise would be transmitted to the frame. Underclearance is increased over that of the old-type axle. *Clark Equipment Co., Battle Creek, Mich.*

VARIABLE SPEED DRIVE—A new size Vari-Speed Motodrive, Model No. 8000, has a capacity of 25 HP and is available in all speed ranges from 2:1 to 6:1. It is offered in horizontal and vertical designs. Handwheel controls are also available. A tachometer, calibrated to the user's specifications, may also be attached. *Reeves Pulley Co., Columbus, Ind.*

The Paper Industry New Literature

Books

INDUSTRIAL WATER POLLUTION, Survey of Legislation and Regulations. Compiled by R. S. Aries & Associates, Consulting Engineers & Economists. Published by Chemonomics, Inc., 400 Madison Ave., New York 17, N.Y. 142 pages. Paperbound. 9 x 6. $5.00.

This handbook lists and discusses the regulations on water pollution now in effect in every state and territory of the United States, alphabetically arranged by state. It presents the various definitions of water pollution formulated by each state, the measures necessary to comply with the state's regulations, the enforcement procedures enumerated in the laws, and the steps which must be taken by manufacturers to abate water pollution. The Federal Standard legislation governing water pollution is discussed in some detail. A brief discussion of the various interstate agencies active in water pollution control is also given.

The appendix gives a tabulation of the water standards of interstate agencies and a complete list of all state agencies concerned with water pollution.

ADHESION AND ADHESIVES. By N. A. DeBruyne and R. Houwink. Published by The Elsevier Press, 402 Lovett Boulevard, Houston, Tex. 517 pages. 9¾ x 6¼. $10.00.

This book is a symposium by specialists, which attempts to clarify the intricate physiochemical theory of adhesion. It examines the theoretical bases of adhesion, describes technological methods and indicates the solution of practical problems.

The theoretical aspects of adhesion are covered in the first four chapters: general conditions for wetting and for adhesion, molecular forces, rheology of adhesives and static problems. Part two of the book deals with the technological aspects of adhesion. Chapters on organic adhesives and cements, rubbery adhesives, adhesion in soldered joints, and the physical testing of adhesion and adhesives are included in this section.

MINERAL WOOL INSULATION SPECIFICATIONS & STANDARDS. Published by Industrial Mineral Wool Institute, 441 Lexington Ave., New York 17, N.Y. $3.20.

Used as a guide in properly selecting materials and application practices for government contracts and as a basis for specification within industry itself, this insulation handbook includes 21 specifications and standards by four government agencies—Federal, Navy Department, U.S. Maritime Commission, U.S. Department of Commerce —and the American Society For Testing Materials.

Among the subjects helpful in specifying and installing mineral wool insulations for most satisfactory and reliable performance are: types of products, physical properties, characteristics, construction, selection, standard dimensions, temperature limits, thicknesses, auxiliary materials, application techniques and testing methods.

Specifications by each of the five sources are grouped in sections identified by celluloid tabs. Provision is made for insertion of additional up-to-date material.

METALLIZING HANDBOOK. Published by Metallizing Engineering Co., Inc., Long Island City, N.Y. 250 pages. $3.00.

The result of almost 20 years of experience in the design, manufacture and use of metallizing equipment, this new handbook provides a comprehensive coverage of the technical as well as practical aspects of the metallizing process. Various methods of surface preparation and the application of metallized coatings for machine element work, corrosion work, and many special production jobs are thoroughly detailed.

Supplementary information such as the repair of blow-holes in casting, brazing and soldering, glass and ceramics, mass coatings in tumbling barrels, electric circuits and model work is also included.

Booklets and Pamphlets

RAPID IDENTIFICATION OF SOME METALS AND ALLOYS. Published by Internataional Nickel Co., Inc., (Development and Research Div.), New York 5, N.Y. 48 pages. 8½ x 5½. This outline offers simple, spot-testing procedures, which can be used in the laboratory and the shop. Ordinary familiarity with plant processes and the charts in this outline will enable the operator to eliminate many materials from consideration before testing is begun.

PATENTS FOR TECHNICAL PERSONNEL. By Dr. Worth Wade. Published by Chemonomics, Inc., 400 Madison Ave., New York 17, N.Y. 44 pages. 6 x 9. $3.00. This publication is in the form of a ready handbook on patents, their development, and current practice. Listed are the steps that must be followed to protect an invention, the interference and prosecution of patents. A typical company's patent department is described, together with its relation to the inventor-employee. A chapter is devoted to the subject, "How to Read a Patent."

FINANCIAL MATURITY OF BOTTOMLAND RED OAKS AND SWEET GUM. Published by the Southern Forest Experiment Station, Lowich Building, New Orleans 13, (Occasional Paper 117). Answering the question, "When does a hardwood sawlog tree cease to pay its way in the forest and become ripe for cutting?" this book was prepared by Sam Guttenberg and John A. Putnam of the Southern Forest Experiment Station. Described is a method by which land managers can determine when their trees are financially mature—that is, when to cut them for the greatest profit.

BIBLIOGRAPHY OF FOREST INDUSTRY EDUCATIONAL MATERIALS. Published by American Forest Products Industries, Inc., Washington, D.C. 12 pages. 4 x 9. This book lists and briefly describes educational materials available from forest industry sources. It is designed to supplement the AFPI School Bibliography of Forests.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Enclosed Motors. Allis-Chalmers Mfg. Co., Milwaukee 1—Bulletin 51B7225 (6 pages) gives complete construction details of Allis-Chalmers' totally-enclosed, fan-cooled motor. The new cooling system is described and specifications, including ratings and dimensions, given.

Plate Fabrication. Colonial Iron Works Co., 17631 St. Clair Ave., Cleveland 10—This new 8-page catalog demonstrates Colonial's facilities in the fabrication of plate steel and alloys. Examples of the firm's work in the field are illustrated.

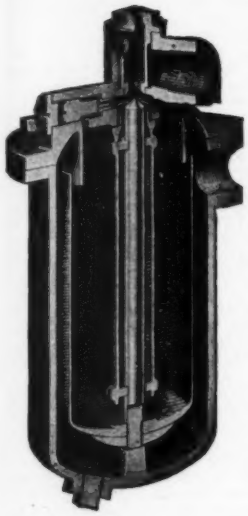
Metal Detector. Eriez Mfg. Co., Erie, Pa.—Eriez, as the marketing agent for the RCA Special Metal Detector, describes the instrument in the 4-page catalog E-61. This protecting device is designed for the inspection of thin sections such as record compounds, rubber products and any other material in sheet form. The detector indicates the presence of metallic particles as small as .039" in diameter. Illustrations and specifications are given.

Materials Handling. Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia 15—"The How Book of Cost Cutting Materials Handling," a 24-page publication, covers basic types of industrial handling tools and a plan for evaluating present handling methods. Included are charts and summary sheets for making a materials handling analysis.

Nickel Cast Irons. International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.—The information contained in this 28-page basic reference bulletin is designed primarily for engineers. Many characteristics of nickel cast irons are presented. Fifty illustrations indicate wide industrial usage. Included are tables, charts, and photomicrographs showing how through the use of nickel the engineering properties of cast iron can be controlled.

Fork Truck Attachments. Baker-Raulang Co., Industrial Truck Div., Cleveland 2—Bulletin 1350-1 (2 pages) describes and illus-

A Stickle Trap on every dryer earns EXTRA MONEY for you!

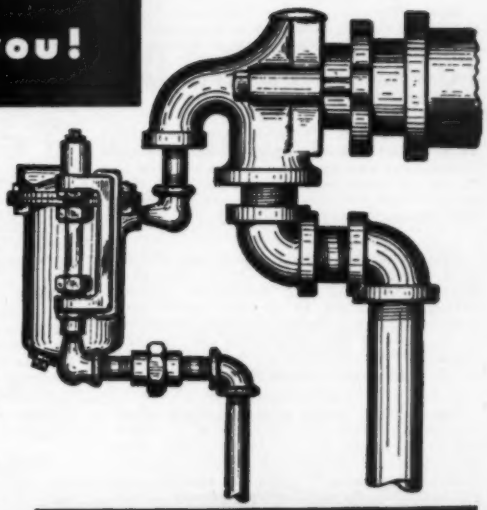


When machines operate at drying pressures of less than five pounds, or on vacuum, *individual* trapping of dryers is your best assurance of proper, profitable drainage. A Stickle Trap on every dryer will discharge air and condensation quickly and economically—save fuel, save steam, *save money!*

Stickle Open Float Traps are engineered for economy. By-pass for air is built right in. Self-regrinding valve prevents wire drawing. Users report Stickle Traps have worked 'round the clock for 20 years *without a penny for maintenance.*

To assure you of the right trap for your particular requirements, Stickle makes 60 types and sizes—in capacities ranging from 250 to 46,000 lbs. per hour. And there's a GUARANTEED 60-DAY PROVING PERIOD for every installation—you must be satisfied!

Write or phone for full information on money-saving Stickle Traps. Ask for *free* illustrated catalog No. 160.



Stickle Equipment
Cuts the cost of steam

STICKLE STEAM SPECIALTIES COMPANY
2215 VALLEY AVE. INDIANAPOLIS 18, INDIANA

PHOTOVOLT
Photoelectric REFLECTION METER

for accurate measurement of

Brightness and Opacity

of pulp and paper in terms of TAPPI specifications. Also for

Gloss and Color

tests on paper, cardboard and other paper products.

Portable, reliable, rugged, simple to operate

PHOTOVOLT CORP.
95 MADISON AVE. NEW YORK 16, N. Y.
Also: Colorimeters, pH Meters

Oriskany
WATERBURY FELTS

Performance records are what *really* count! Oriskany Waterbury Felts have been meeting high production demands throughout the paper industry . . . on all types of machines . . . since 1869!

H. Waterbury and Sons Co.
Oriskany, New York

trates the new Baker 4-purpose carriage, which provides standard fork use, clamp action, fork spacing for different load widths, and side shifter action.

Resin Varnish. Snyder Chemical Corp., Dept. 4W, Bethel, Conn.—A new bulletin describes the properties and most recent information on the handling of SYNCO 418, a light colored resin varnish for the surfacing of decorative laminates.

Angle-Set Vises. Universal Vise & Tool Co., Parma, Mich.—This 6-page bulletin includes illustrations and specifications, in addition to 12 typical angle set-ups for Universal's line 3-Way angle-set vises. Uses are suggested and prices given.

Fire Protection. American-LaFrance-Foamite Corp., Elmira, N. Y.—"Correct Fire Protection" is a 32-page illustrated booklet giving information as to the correct type extinguisher that should be used according to the class of fire. Illustrated are the various sizes of units available for use with the different kinds of extinguishing agents.

Detergents. Dexter Chemical Corp., Textile Chemical Div., New York 59, N. Y.—This file folder, with inserts to be added from time to time, includes such topics as evaluation of detergents by chemical analysis, use of builders and sequestering agents in detergents, differences between anionic, cationic and nonionic detergents.

Copying Machines. Charles Bruning Co., Inc., 100 Reade St., New York 13—Booklet A-2009 gives detailed description of the Model 20 Copyflex, a standard 46" printing width machine for producing a medium volume of copies. Makes copies of large office forms and engineering drawings.

Alloy Welding Electrodes. Alloy Rods Co., York, Pa.—This bulletin (AR51-1) is a 13-page brochure designed for firms connected with the current Defense Production Program. A short review of electrodes used in welding operations is presented, together with detailed descriptions of the latest welding methods and equipment. Typical chemical and mechanical qualities are given.

Dust Recorder. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44—Instrumentation Data Sheet No. 10.14-6 describes a new gas dust analyzer with a Brown ElectroniK Potentiometer. A complete description is given, as are application and operation data, for this instrument which checks the operation of precipitators.

Air Treatment Equipment. Westinghouse Electric Corp., Sturtevant Div., Hyde Park, Boston 36—Booklet B-5164 is a 16-page, condensed full-line catalog. Equipment for air conditioning, air handling, and air cleaning is described in detail. Specifications, capacity data, and outstanding features are presented.

Water Columns and Gages. Yarnall-Waring Co., Chestnut Hill, Philadelphia 18—Bulletin WG-1811 replaces the 1948 Yarway publication on steam plant equipment. Among items described are flat-glass inserts used in high-pressure gages, pressure-sealed floating assembly design, and non-stick gaskets. Construction details for all types of this equipment are given, as well as a spare or repair parts list.

Materials Handling. Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.—"Basic Facts About Materials Handling" is a 24-page booklet giving complete information on the system of handling recommended for use with Clark fork-lift trucks.

pH and Conductivity Recorders and Controllers. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44—This 40-page catalog (15-16) covering pH, oxidation-reduction potential, and electrolytic conductivity contains information on equipment for these process variables. Included is information on the latest designs of pH electrodes and conductivity cells, as well as fundamental operating principles, descriptions of measuring systems, and details of components.

Pyrometer Supplies. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44—This supply catalog (100-4) furnishes technical data on the application and use of thermocouple pyrometric supplies. Included is a complete line and all basic prices of Brown thermocouple assemblies. Exploded views of all assemblies are given.

Lubricated Plug Valves. American Car & Foundry Co., 1501 E. Ferry Ave., Detroit 11—This 8-page catalog (C20M-51) gives the complete line of lubricated plug valves, specifications, and applications. Also listed are auxiliary equipment and lubricants.

Hand Trucks. Howe Scale Co., Rutland, Vt.—This 12-page condensed truck catalog includes specifications and illustrations for the complete line of two- and four-wheel hand trucks, trailer trucks, baggage wagons, platform skids, dollies, lift jack systems, wheels, casters, and molded-on-rubber tired wheels. This form (508-B) also shows construction features.

Welding Problems. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.—This data file contains well over 100 pages of illustrated technical data on maintenance and repair welding problems and procedures. Included are information on metal-joining procedures, data sheets, and information on a full line of more than 160 different Eutectic low-temperature alloys.

Magnetic Separators and Lifting Magnets. Dings Magnetic Separator Co., Milwaukee 46—This 12-page catalog (C-5000-B) briefly describes the firm's entire line. Recommendations are given as to the proper magnets for use in specific circumstances. Units for magnetic concentration and purification, heavy media recovery, and materials are also described.

Stock Preparation Drives. General Electric Co., Schenectady 5, N. Y.—This 8-page bulletin (GEA-5556) describes electric drives for paper stock preparation. Outlined are the benefits of the drives when used for pulpers, beaters, refiners, pumps, and other stock preparation apparatus. The publication is illustrated with 16 photographas of electrical drives and their applications.

Synthetic Urea. Foster Wheeler Corp., 165 Broadway, New York 6—"Synthetic Urea by the Pechiney Process" is a 12-page booklet describing the properties, uses and manufacture of synthetic urea. Suggested uses are given.

Breaker Trap. Sutherland Refiner Corp., Trenton, N. J.—This descriptive 4-page folder (851) describes a recently perfected machine for the selective defibering of pulps and waste papers that also removes tramp metal. The Machine handles up to 350 tons per day. Specifications, applications, and operational data are given.

Purge Meters. Brooks Rotameter Co., Lansdale, Pa.—The complete line of Brooks Rotameters is presented in this bulletin (110). The line ranges from meters for small flow indication of liquids or gasses to high capacity, high pressure meters.

Composite Fabrication. Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15—This product design study (No. 32) deals with the solution of design problems resulting from complex parts through the use of cast-weld construction and composite fabrication. The 4-page leaflet presents eight proved advantages of steel castings.

Roof Ventilator. Swartwout Co., 18511 Euclid Ave., Cleveland 12—This 2-page bulletin (346) gives complete description and specification data on the firm's powered roof ventilator. A dimension table and one on sizes and capacities are presented.

Steel Tubing. Babcock & Wilcox Tube Co., Beaver Falls, Pa.—Technical data on tubing for the petroleum, chemical, pulp and paper, food and pharmaceutical processing industries is presented in an 8-page bulletin (TA 1559). Included are analyses and tables of physical and mechanical properties, as well as application data for 20 popular carbon, alloy and stainless tubing steels.

Pumps. Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia 18—This 24-page illustrated bulletin (251) covers motor-driven controlled volume pumps, which handle heavy viscous liquids, light solvents, solids in suspension, abrasive slurries, hot or cold liquids, liquefied gases, and other materials. Included are details on pump capacity and capacity pressure selection tables. Specifications of the firm's line are presented.

Rotary Pumps. Worthington Pump & Machinery Corp., Harrison, N. J.—Bulletin W-485-B1 is a 4-page publication covering the firm's heavy-duty, vane-type rotary pump. The six models in eight sizes are described. Capacities range from 25 to 1,000 gpm and speeds from 850 to 210 rpm. Dimensions, nominal ratings, and line drawings are included.

Equivalent Valves. Equivalent Valves Co., Los Angeles 44, Cal.—This 170-page looseleaf manual is described in a multi-colored sheet now available. The manual compares the valves of 18 leading manufacturers by material, type, pressure rating, structural variations. Shows sizes for cast iron and bronze valves.

Air Conditioning Package Pumps. Allis-Chalmers Mfg. Co., Milwaukee 1—Package pumps engineered for fractional horsepower applications in capacities to 80 gallons per minute at heads to 100 feet are described. Performance data and dimensions for the various pump types are given.

Process Control Equipment. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44—Specification Sheet No. 768 (4 pages) describes controllers for process variables, such as temperature, pressure, flow and liquid level. Specifications and operation explanations are presented.

Electric Trucks. Yale & Towne Mfg. Co., Philadelphia 15 — This 16-page booklet (P809) describes the application, types, and operation features of the Yale line of motorized hand trucks and electric stackers. The trucks are available in capacities up to 6,000 lb. Capacity specifications are given.

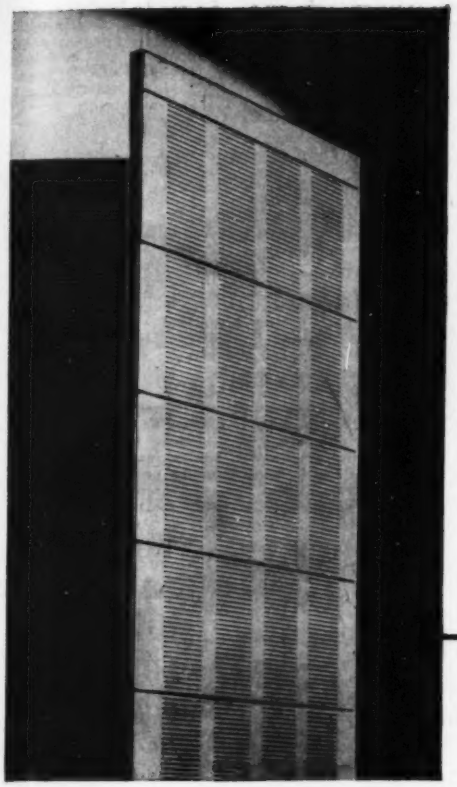
Flooring. Tremco Mfg. Co., Cleveland—Resilient asphalt mastic floors are discussed in this 4-page bulletin. Suggested uses and a check list of typical flooring problems are included. Various applications of this industrial flooring are described.

Side-Drive Pulper. Cowles Co., Inc., Cayuga, N. Y.—This new bulletin describes how hard stock can be defibered quickly and completely through the use of the Aquapulper. New design features are covered. Size and other specifications are given.

Steam Turbine Generator. Allis-Chalmers Mfg. Co., Milwaukee 1—Design and construction features of the firm's WA-Series generator, manufactured in NEMA ratings of 2,000 to 7,500 kw, are described in this 3-page bulletin (03B7654). Cross-section views are given, as are special design features.

Roller Chains. Chain Belt Co., Baldwin-Duckworth Div., Milwaukee 4—This 12-page bulletin (51-2) pictures and describes in detail the Baldwin-Rex Double Pitch Roller Chains. Charts, photographs, diagrams, and tables show in detail both the drive and conveyor-type chains, together with the standard attachments available.

Metallic Bellows, Hose and Tubing. Chicago Metal Hose Corp., Maywood, Ill.—This 16-page catalog (CMH 123) is prepared especially for product designers. Information



Here's Why More Than

30,000 FABRICATED SCREEN PLATES

Are Now In Service

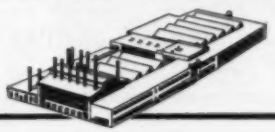
"Hardy" fabricated screen plates, made by Magnus, have a high-strength, thin-sheet design—specially engineered for maximum flow. That's why you're sure of these 3 service-proved advantages:

1. Increased Plate Capacity—The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

2. Longer Life—Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance.

3. High, Sustained Yield—You get consistent, uniform quantities of cleaner pulp.

It all adds up to improved performance at reduced operating costs. Complete information is yours on request. Or if you like, we'll gladly have an engineer call.



MAGNUS METAL CORPORATION, *Fitchburg, Massachusetts*

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

Paper Mill Engineers!

GET THE VALVE THAT MEETS YOUR SPECIFIC NEED

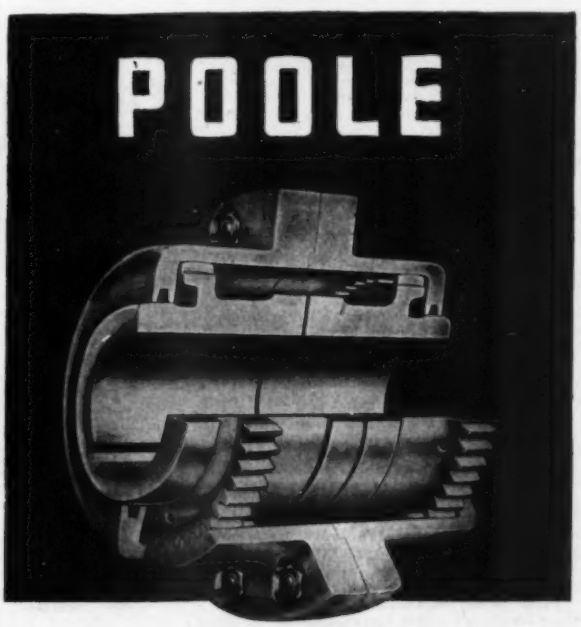
Designed to control the flow of heavy solutions of paper stock with a minimum of maintenance. Made from all types of stainless steel, monel or any combination. Contact nearest agent.

AGENTS:
SOUTHERN CORPORATION, Charleston, S. C.
M. J. GIGY & ASSOCIATES, San Francisco, Cal.
JOHN B. ASTELL & CO., New York, N. Y.
NORTHWEST COPPER WORKS, Inc., Portland, Ore.
THOS. W. MacKAY & SON, Ltd., Vancouver, B. C.

FABRI-VALVE CO. OF AMERICA

2100 N. Albina Ave., Portland, Oregon

POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY — WOODBERRY, BALTIMORE, MD.

The Paper Industry

Professional and Business Services

ARTHUR C. DRESHFIELD, Ch.E.
CONSULTANT
Research . . . Development . . . Control
Market Research
Laboratory Investigations thru affiliation with
Chicago Testing Laboratory
536 Lake Shore Drive, Chicago 11, Illinois

Engineers
Industrial Plants • Textile & Paper Mills • Location Studies • Appraisals • Reports • Surveys
J. E. SIRRINE COMPANY
GREENVILLE
SOUTH CAROLINA

is included on metallic bellows of stainless steel, brass, bronze and other alloys, and on several types of flexible metal hose and tubing. Specifications and a guide to proper applications are presented.

Materials Handling Equipment. Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.—This 6-page bulletin (TC-53—25M) uses a system of visual cross reference charts to make all essential model and attachment information for both gas and electric fork-lift trucks available at a glance. Specifications are given by model and capacity. Similar treatment is given Clark towing tractors, powered hand trucks, hand pallet trucks, hand platform trucks, and hand stackers.

Corrosion Protection. Permolite, Inc., Hamilton, Ohio—This 6-page folder, "Low Cost Corrosion Protection," explains Permolite pigmented organic corrosion-resistant coatings, their application by brush, spray or dip. Typical applications are listed.

Thermocouple Wells. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44—Catalog No. 200-1 gives technical information concerning the selection of the proper well for any given application. Curves are provided to show the proper selection method. Photographs and dimensional drawings, together with basic prices, are shown.

"Water Hammer" in Piping Systems. Williams Gauge Co., 1620 Pennsylvania Ave., Pittsburgh 33—Cause, effect, and control of water hammer in piping systems are considered in this 8-page bulletin (WH-851). Included are curves representative of studies made of this phase of hydraulics. Information included is believed applicable to many various liquids.

Floor Brick Installation. Master Builders Co., Cleveland 3—This 4-page bulletin (E-27) on the Embeco method for setting floor brick and heavy tile, in addition to presenting information and data of interest to industries using and installing this industrial flooring, gives complete specifications and properties.

Lubrication Unit. C. A. Norgren Co., 222 Santa Fe Drive, Denver 9, Colo.—This data sheet (No. 104) gives details of equipment that automatically coordinates the operating pressure and relief pressure and prevents any scored air cylinders and damaged packing on the Jackson & Church pulp presses. Operating and equipment data is included.

Tube Fittings. Crawford Fitting Co., 884 E. 140th St., Cleveland 10—Catalog B-151 (12 pages) describes and illustrates the complete line of leakproof Swagelok tube fittings, which are available in brass, aluminum, steel, stainless steel, and Monel. Complete dimensional information, cross section drawings, installation recommendations, and assembly instructions are included.

Roll Separation. Johnstone Engineering & Machine Co., Parkersburg, Pa.—This 4-page bulletin (951) describes in detail the firm's medium and heavy duty slitters and roll winders. Freely separable rolls, score-cut slitter, drum winder, adjustable-speed drive, precision-cut gears, floating pressure roll drive and balanced pressure roll drive, together with specifications, are illustrated.

Industrial Dust Collection and Recovery. Buell Engineering Co., Inc., 70 Pine St., New York 5—This new bulletin, "The Collection and Recovery of Industrial Dusts," gives in 28 pages a complete description of the firm's recovery and collection equipment, together with suggested applications to suit different situations. Described are cyclones, precipitators, collectors, combination systems, special purpose collectors, and hopper valves. Typical data sheets that should be used in making inquiries are given.

Coal Handling. Link-Belt Co., 307 N. Michigan Ave., Chicago 1—This 44-page book (2410) gives descriptions of industrial belt uses for handling coal and ash at power plants. Included are layout drawings and illustrations of actual installations, suggestions for solving handling problems, and unloading, auxiliary unloading, storage and reclaiming, crushers, transporting and distributing equipment, and water intake screens. Specifications are included.

PIPING DESIGNER

Excellent salary with considerable premium overtime is offered to a man with heavy experience in oil refinery or chemical plant piping.

Duties involve design and layout work plus the coordination of the work of other designers and draftsmen.

Excellent opportunity to assume additional responsibility in an organization established over half a century . . . known throughout the world for leadership in the design and construction of oil refineries and chemical plants. Convenient New York City offices located near all local and commuting transportation facilites.

Please write complete details preliminary to confidential interview to:

The M. W. KELLOGG Co.
225 BROADWAY NEW YORK 7, N.Y.
att. Mr. Coyne, Room 1302

pH Indicator. Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia—This 8-page folder (EM9-96(1) 350-951) introduces an advance design, line-operated pH indicator with high stability. Readings can be made within 0.02 (plus or minus). Specifications and typical uses are presented.

Strip Chart Recorders. Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia 44—Specification Sheet 769 (6 pages) gives a detailed description of these recorders designed especially for graphic panel use. Operating methods are described, as well as dimensions and applications.

Trackage Systems. Engineering Products Co., Inc., 122 S. Michigan Ave., Chicago 3—This Epco catalog (12 pages) explains the firm's systems for moving heavy industrial loads. Various methods and installations are described and illustrated. Specifications are included.

Controllers. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44—This 16-page catalog (8000) illustrates and describes vane-type electric contact control units for use with the firm's thermometers, pressure gauges, potentiometer, millivoltmeters.

Paints. Wilbur & Williams Co., 130 Lincoln St., Brighton 35, Mass.—This 4-page technical folder contains a quick reference index to determine the most suitable coatings for rust prevention, chemical corrosion, and dampness.

Filters. Oliver United Filters, Inc., 33 W. 42nd St., New York 18—This 8-page bulletin (10-G) lists and briefly outlines 21 filter types for the process industries. Details are given for 15 of these filters, for the Olivite acid-handling pump, and for the ODS slurry and sludge pump.

Automatic Emulsifier. Hercules Powder Co., Wilmington, Del.—A 10-page booklet describing the firm's simplified automatic emulsifier. A feature is a four-color diagrammatic flow sheet which enables readers to follow the flow of rosin size through the process. A brief description of the operation is included, with instructions for obtaining further layout and construction information.

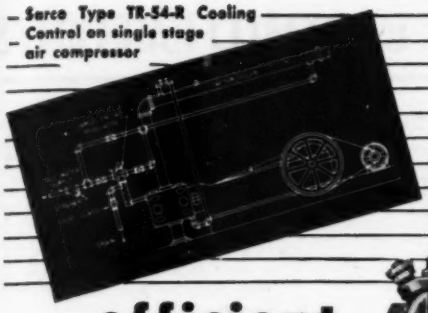
Fork Trucks. Baker-Raulang Co., Industrial Truck Div., Cleveland 2—Bulletin 1327 (8 pages) describes Type FS 2000-pound fork truck. Photographs demonstrate the major components, with complete construction details accompanying each illustration. Dimension and specification sheets contain complete engineering information.

Explosion-Proof Motors. U. S. Electrical Motors, Inc., Los Angeles 54—Various types and models of the firm's explosion-proof electric motors are described in this 8-page booklet (1629-30M). A cut-away diagram shows detailed construction information. Illustrations show typical uses.

Ion Exchange Materials. National Aluminate Corp., 6216 W. 16th Place, Chicago 38—Three technical bulletins (57, 58, and 59) deal with Nalco ion exchange materials. A separate bulletin covers each of three exchangers: Nalcite HCR, a styrene type cation exchanger; Nalcite SAR, a strongly basic anion exchanger, and Super Nalcolite, a synthetic gel-type zeolite for cation exchange. Complete discussions, supplemented with tables and graphs, explain the performance of these water treating resins under various operating conditions. Physical characteristics of the materials, exchange capacities, and regeneration techniques are explained.

Driveshafts. Morse Chain Co., 7601 Central Ave., Detroit 8—This new bulletin gives complete data and specifications on Morflex radial driveshafts with spline-jointed tubular shafts, Morflex universal driveshafts with one-piece tubular shafts, and Morflex universal driveshafts with spline-jointed tubular shafts. Included is a working table of maximum recommended lengths and speeds.

Sarco Type TR-54-R Cooling Control on single stage air compressor



Sarco TR-54-R

efficient COMPRESSOR COOLING

- Do you want to avoid over — or under — cooling?
- Do you want to save cooling water and lubricants?
- Do you want to increase the efficiency and life of your air compressor? . . . then install SARCO COOLING CONTROLS

Simple • Self-operated • Inexpensive

Ask for Bulletin No. 701

SARCO COMPANY, INC.

EMPIRE STATE BUILDING, NEW YORK 1, N.Y.

Represented in Principal Cities
SARCO CANADA LTD., TORONTO 5, ONTARIO

518

EMPLOYMENT SERVICE FOR PULP AND PAPER MILLS
We invite correspondence (confidential) with executives seeking positions and with employers seeking personnel.
CHARLES P. RAYMOND SERVICE, Inc.
Telephone Liberty 2-6547—294 Washington St., Boston 8, Mass.

WANTED—Desirous connections as sales representative, exclusive or side line. Many years experience in paper, envelopes, binders and kindred specialties. Pacific Coast or principally Northwest territory. Address: Box 529, The Paper Industry.

FOR SALE—One Thrissell (England) rotary carton-making machine, comprising two dry offset units, one letterpress unit, cutting, creasing, and scoring unit, automatic stripping, stacking and counting—board from reel only, maximum calipre .030", maximum width 18", maximum circumference of cutting and printing units 26½", normal speed 110 rpm. Also complete set of printing and cutting units and many other spares. Suitable for high speed production work only. 1938 machine, unused during War and thoroughly reconditioned. Including 5 hp. variable speed motor 400/3/50. Price $2500. Further particulars and photographs on request. W. A. Lucas & Co., 119 Catford Hill, London S.E.6, England.

Nine Publications for Papermakers

Modern Pulp and Paper Making	$8.50
Drying of Paper on the Machine	1.50
Procedure Handbook of Arc Welding	2.00
Outside U.S.A.	2.50
Notes and Observation on Beaters	1.00
Lessons in Papermaking—Part 1	1.00
Lessons in Papermaking—Part 2	1.00
Trouble on the Paper Machine	.75
Pulp Bleaching (A Symposium)	.50
Technology of Papermaking Fibres	.50

Mail your order with payment to:

The PAPER INDUSTRY

% Fritz Publications, Inc.
431 S. Dearborn Street, Chicago 5, Illinois

THE RIGHT COMBINATION

Layne offers you the right combination of unmatched experience plus modern equipment for installing well water units of any size—and for any purpose. Layne has made more water supply installations than any other firm in the entire world, and this valuable experience places Layne in a position to unquestionably do every job exactly right. Once the installations have been made, a complete record of everything is kept; strata formation, sand porosity, casing details, sand screen length, diameter and metal used, all pump information including bearings, shafting, impellers and operating characteristics. With such information, Layne is always in a position to give quick and most economical service for adjustments or repairs if and when needed.

Everything by Layne

Layne accepts your contract for furnishing everything; Layne supervision, Layne drill crews, Layne drill equipment, Layne designed and Layne built louver type sand screen and Layne high efficiency vertical turbine pumps. No other firm is involved, therefore there is no divided responsibility. This plan gives you the very finest well water supply units that world wide experience and skill can possibly design and build.

Layne offers a wide range of fully illustrated catalogs covering all phases of well water installations for all types of industry. Write for more information.

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

Layne
WATER SUPPLY
WELLS & PUMPS

ATKINS

"Silver Steel"

CHIPPER KNIVES

for **UNIFORM CHIPS**

Obtainable for any machine—any type of fastening—Atkins *"Silver Steel"* Chipper Knives, made from High Carbon-High Chrome, or other high grade alloy steels, are world-famous for *producing uniform chips!* . . . Pulp and paper mills report longer runs between sharpenings with faster, easier grinding. Perfectly balanced in sets, accurately finish ground to size, *"Silver Steel"* Chipper Knives prove quality and value by performance!

ATKINS PAPER KNIVES

Concave face to prevent drag. Mirror finish. "Guaranteed" to fit your most exacting requirement! Atkins *men in the field* know paper cutting problems—will gladly help you solve yours!

ATKINS

Use—Don't Abuse—Fine Tools!

ONLY ATKINS MAKES "Silver Steel" PRODUCTS*

*in U. S. A.

E. C. ATKINS AND COMPANY
402 South Illinois Street, Indianapolis 9, Indiana

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are OPS ceiling prices, cents per pound, delivered mills:

	per cwt.
Blue Overalls	14.50
Corduroy	8.00
Washables, No. 1	6.50
Percales	12.50
Light Prints, No. 1	11.50
Khaki Cuttings—	
Sun Tan	11.50
Mixed	8.00
New White Canvas	19.00
Canton Flannels, bleached	21.00
Canton Flannels, unbleached	21.00
Shirt Cuttings—	
New White No. 1	21.00
Silesias No. 1	16.00
New Unbleached	21.00
Fancy	10.00
Linen Cuttings—	
American	14.50
White	21.00
Grey	21.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.60 to 1.70
No. 2	1.10 to 1.20
No. 3 and 4	.95 to 1.05
Twos and Blues—	
Repacked	5.00 to 5.25
Thirds and Blues—	
Repacked	4.50 to 4.75
Miscellaneous	4.00 to 4.25
Whites, No. 1—	
Repacked	8.00 to 8.50
Miscellaneous	6.50 to 7.00
Whits, No. 2—	
Repacked	5.50 to 6.00
Miscellaneous	5.00 to 5.25

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	6.75 to 7.00
Domestic	6.75 to 7.00
Wool Tares—	
Light	8.50 to 9.00
Heavy	9.00 to 9.50
No. 1 Scrap Bagging	5.75 to 6.25
Manila Rope—	
No. 1 large	10.00 to 10.50
No. 1 small	9.00 to 9.50
Sisal Rope—	
No. 1 large	8.50 to 9.00
No. 1 small	8.00 to 8.50
New Burlap Cuttings	8.00 to 8.50
Jute Threads—	
Foreign (Nom.)	8.00 to 8.50
Domestic	8.00 to 8.50
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	4.00 to 4.25

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	165.00—
Hard White, No. 1	140.00—
Soft White, No. 1	110.00—
Soft White, one-cut	125.00—
Soft White, Misc.	90.00—
Fly Leaf, No. 1	45.00—
Fly Leaf, Woody No. 1	40.00—
No. 2 Mixed Col. Woody	35.00—
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	40.00—
Mixed Books	26.00—
Ledger Stock—	
No. 1 White	100.00—
No. 1 Mixed (Colored)	75.00—
Manilas—	
New Env. Cuttings	110.00—
New Env. Cuts, One-Cut	—
Extra Manilas	65.00—
Manila Tab Cards, Free of Ground Wood	110.00—
Colored Tab Cards	85.00—
Kraft—	
New Envelope Cuttings	110.00—
Tripled Sorted No. 1 100%	55.00—
No. 1 Old Assorted	35.00—
News—	
White Blank	75.00—
Overissue	18.00—
No. 1 Folded	14.00—
Old Corrugated Containers	16.00—
New Jute Corrugated Cuts	24.00—
Mill Wrappers	14.00—
Box Board Chips	10.00—
No. 1 Mixed Paper	10.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	35.00 to 36.00
Argentine, lb.	34.50 to 35.00
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	15.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tanks cars (wks) cwt.	2.70—
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	54.25 to 54.75
Litharge, powd. bbl. lb.	20.50 to 21.00
Rosin (Gum)—	**New York, per 100 lbs.**
E	9.30—
F	9.30—
G	9.30—
WW	10.25—
Rosin (Wood), carlots,	
F.O.B. South	5.50 to 5.75

MARKET QUOTATIONS

Salt Cake—
Dom. bulk (wks) ton..... 17.00 to 23.00
Imp. bulks on dock—
(Atl. ports) ton (Nom.) 25.00—

Soda Ash—
Bulk (works) cwt..... 1.30—
Paper bags, cwt..... 1.60—

Soda (Caustic)—
Solid drums, cwt..... 3.35 to 3.40
Ground and flake, drums, cwt. ..... 3.75 to 3.85

Sodium Silicate—
60 deg. 55 gal. drums, (works) cwt. ..... 1.70 to 1.80
40 deg. 35 gal. drums, (works), cwt. ..... 1.40 to 1.50

Starch—
Pearl, 140 lb. bags, cwt. 6.19—
Pearl, barrels, cwt..... 6.19—
Paper (Sp.) bags, cwt..... 6.19—
Powdered, barrels, cwt.... 6.42—

Sulphur (Crude)
(Mine) bulk, long ton.... 21.00 to 22.00

Talc—
Dom. 100 lb. bags (mine) ton ..... **25.00 to 28.00**
Canadian ..... 35.00 to 45.00

Titanium Dioxide—
Barium Pig, bbls., lb..... .21 to .21½
Calcium Pig, bbls., lb..... .21 to .21½
Zinc Sulphide, bbls., lb.... 11.50 to 11.75

WOOD PULP

The following are OPS ceiling prices on domestic wood pulp, dollars per short air dry ton delivered consuming mills including the basic maximum freight allowances as provided:

Bleached sulphite .....140.00—
Unbleached sulphite .....132.50—
Bleached sulphate .....145.00—
Semi-bleached sulphate .....140.00—
Unbleached sulphate 132.50
Bleached soda .....140.00—
Ground wood ..... 92.50—
Sulphite screenings ..... 72.50—
Sulphate screenings ..... 67.50—
Ground wood screenings..... 60.00—
Unbleached sulphate siderun .....132.50—
Standard news print siderun ..... 92.50—

OPS ceiling prices on European wood pulp, dollars per short air dry ton, on dock at American Atlantic ports, follow:

Bleached sulphite .....225.00—
Bleached sulphate .....230.00—
Unbleached sulphite .....200.00—
Unbleached sulphate .....200.00—

PAPER

Boards—
OPS ceiling prices (CPR 108) per ton, delivered consumer's mill, 10 tons or more:
Plain chip.....105.00—
News vat lined chip.....107.50—
Filled news.....110.00—
Solid news.....112.50—
White vat lined chip.....142.50—
Chip tube and can stock...110.00—
Single manila lined chip...147.50—
Single jute lined chip.....145.00—
White patent coated:
.020 .....175.00—
.018 .....177.50—
.016 .....180.00—

Book Paper—
OPS ceiling prices (CPR 106) per cwt.:

Coated two sides

70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides....	4 cases Carloads	$17.25 $16.30
45 lb. enamel, 25x38-500, trimmed 4 sides.....	4 cases Carloads	$13.05 $12.10

Uncoated

55 lb. No. 2 offset, 25x38-500, trimmed 4 sides.....	4 cases Carloads	$14.80 $13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases Carloads	$14.05 $13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads	$12.40
16 lb. tablet, 17x22-500	Carloads	$11.3[illegible]

Rag Content Bond—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Extra 100% rag.....	57.50	58.50
100% rag.....	49.50	50.50
75% rag.....	38.00	39.00
50% rag.....	29.50	30.50
25% rag.....	24.00	25.00

Rag Content Ledger—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

Extra 100% rag.....	58.50
100% rag.....	50.50
85% rag.....	42.00
75% rag.....	39.50
50% rag.....	30.50
25% rag.....	25.00

Sulphite Bond—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Air dry bond (Watermarked)	20.00	21.00
No. 1 bond (M.F. watermarked)	15.50	16.20
No. 2 bond (M.F. watermarked)	14.90	15.60
Plain bond (M.F. unwatermarked)	14.00	14.60

Sulphite Ledger—
OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

No. 1, M.F. watermarked.....	16.50
No. 2, M.F. watermarked.....	15.90
Plain, M.F. unwatermarked.....	15.00

Glassine (f.o.b. mill)—
OPS base ceilings (CPR 76):

	per cwt.
25 lb. base No. 1 bleached glassine	22.50—
25 lb. base No. 1 bleached greaseproof	20.00—

News—

	per ton
Rolls, Standard (Contract)	114.00 to 116.00
Rolls (Spot).....	(Nominal)
Sheets	130.00—

Tissues (Carlots)—

	per ream
White No. 1.....	2.25—
White No. 2.....	1.75—
Bleached Anti-Tarnish....	—
Colored	2.20—
Anti-Tarnish Kraft	2.10—
Manilla	2.20—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.....	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.....	.90—
Toilet, Bleached (M shts.) per cs.....	9.85—
Toilet, Unbleached (M shts.) per cs.....	6.60—

Towels

	per case
Bleached	6.80—
Unbleached	5.80—

Wrappings (Kraft)—
OPS ceilings, per cwt., 50 lb. base weight:

	per cwt.
Standard wrapping	7.75—
Butchers, counter rolls.....	8.25—
Standard bag, mill rolls....	7.50—
Shipping sack, mill rolls...	7.75—
Gumming, mill rolls.....	8.00—
Asphalting, mill rolls.....	7.75—
Envelope, mill rolls.....	9.25—

Wrappings (Sulphite and Bleached Kraft)—
(Rolls, f.o.b. mill)

	per cwt.
Bleached Papers—	
M.F. & M.G. Waxing, 20 lb. (carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb...	—
Unbleached Papers	
Com. Gr. Butch. 40 lb. No. 1 Butchers.....	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.....	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.....	—
Steam Finish, 50 lb...	—
Water Finish, 50 lb...	—
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1).....	—
Env. Mla., Sub. 16-28 (No. 2).....	—
Envp. Mla. (Prices based on large sheets untrimmed ream marked, in bdls.).....	—
Wrapp. Mla. 35 lb. up—	
No. 1.....	—
No. 2.....	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade B-20 lb.....	—
Grade A-22 lb.....	—

Extend Titanium Save Pulp

by using

DICALITE BP-5

PAPER-AID

Dicalite diatomaceous paper-aids have been used in a large number of paper mills in the last 10 years. Under both war and after-war conditions use of these materials has returned dollar profit besides production improvements. Under today's conditions of higher prices and shortages of certain materials, Dicalite is even more valuable as a paper-making aid.

SAVE TITANIUM DIOXIDE—It is often possible to cut TiO_2 consumption from 10 to 20% (depending on the finished product and mill operating conditions) and still maintain required brightness and opacity when Dicalite is used. Dicalite has a two-way action in the furnish that both "extends" or increases the opacifying and brightening power of the titanium and increases retention of the TiO_2 pigment.

SAVE PULP—Dicalite directly replaces a portion of bleached sulphite pulp at a considerable saving, because of its great bulk and high retention. It will economically replace even cheap fibers in sheets with a weight of 50 lbs. per cubic foot or less. In addition, formation is improved and other operating benefits secured.

DICALITE BP-5 is a high quality high brightness natural material, widely used as a paper-aid. Write or phone our nearest office and a Dicalite engineer will gladly give you further details and supply samples for tests.

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION

NEW YORK 17, N. Y. • CHICAGO 1, ILL. • LOS ANGELES 17, CALIF.

DICALITE

PAPER-AIDS FOR BETTER PAPER PRODUCTS

WISCONSIN

Perfect

Surface

WIRES

Over 50 Years of Service

WISCONSIN WIRE WORKS

APPLETON, WISCONSIN

The Paper Industry Index to Advertisers

When writing them, please mention The PAPER INDUSTRY.

Refer to the Paper and Pulp Mill Catalogue and Engineering Handbook at your mill office, for complete listing of all advertisers' products.

Advertising Council, Inc. 1242
American Car & Foundry Co. 1125
American Defibrator, Inc. .....
American Hoist and Derrick Co. .....
American-Marietta Company .....
Anheuser-Busch, Inc. .....
Anthracite Equipment Corporation .....
Appleton Machine Co., The .....
Appleton Wire Works, Inc. 1217
Appleton Woolen Mills 1152
Armstrong Machine Works 1122
Arnold Hoffman & Co., Inc. .....
Asten-Hill Mfg. Co. 1131
Atkins and Company, E. C. 1238
Aurora Pump Company 1206

Babcock & Wilcox Tube Co. .....
Bagley & Sewell Co., The 1173
Bailey Meter Company 1126
Barco Manufacturing Co. 1111
Barrell Co., William L. .....
Bauer Bros. Co., The .....
Becco Sales Corporation .....
Beckman Instruments, Inc. .....
Beloit Iron Works .....
Bird Machine Company 1136
Birmingham Tank Company .....
Black-Clawson Co., The 1128
Bowser, Inc. .....
Bowsher Co., The N. P. 1228
Broadway Rubber Corp. .....
Buffalo Forge Company .....
Buffalo Pumps, Incorporated 1200
Bulkley, Dunton Pulp Co., Inc. .....

Cameron Machine Co. 1124
Carthage Machine Co. .....
Chain Belt Company 1132
Chicago Bridge & Iron Company 1114
Chicago Electric Company 1228
Classified Advertising 1236, 1237
Cochrane Corporation 1141
Corn Products Sales Co. .....
Curlator Corporation .....

DeZurik Shower Company 1220
Diamond Power Specialty Corp. .....
Dicalite Div., Great Lakes Carbon Corp. 1239
Dietert Co., Harry W. .....
Dilts Machine Works 1128
Downingtown Mfg. Co. 1145
Draper Brothers Company 1223
du Pont de Nemours & Co., E. I. .....

Eastwood-Nealley Corporation 1227
Electric Eye Equipment Co. 1160
Electric Machinery Mfg. Co. 1135
Elliott Company 1163
English China Clays Sales Corp. 1222
Eriez Manufacturing Co. 1205

Fabri-Valve Co. of America 1235
Farquhar Company, A. B. .....
Fawick Airflex Company, Inc. .....
Fisher Governor Co. 1133
Fitchburg Screen Plate Co., Inc. .....
Foxboro Company, The .....
Fritz Publications, Inc. 1237, 1241
Fulton Iron Works Company 1121

Garlock Packing Co., The .....
General American Trans. Corp. .....
General Chemical Division, Allied Chemical & Dye Corporation .....
Gilbert & Nash Company .....
Goulds Pumps, Inc. 1140
Graton & Knight Co. 1159
Graver Water Conditioning Co. .....
Griffiths & Sons, Inc., James .....
Gruendler Crusher & Pulverizer Co. .....

Hanchett Manufacturing Co. 1220
Harrington & King Perforating Co. .....
Hercules Powder Company .....
Hooper & Sons Co., Wm. E. 1123
Hubinger Company, The .....
Hudson-Sharp Machine Company 1226
Huyck & Sons, F. C. .....

Improved Paper Machy. Corp. .....
Infilco Incorporated .....
Ingalls Iron Works Co. .....
Insul-Mastic Corporation of America .....
International Harvester Co. 1112

Jackson & Church Company ..... 2nd Cover
Jeffrey Mfg. Co., The .....
Jenkins Bros. .....
Jenssen Company, Inc., G. D. 1230
Johnson Corporation, The 1220
Jones & Sons Company, E. D. 1231

Kalamazoo Tank & Silo Co. 1219
Kelco Company 1138
Kellogg Co., The M. W. 1236
Kuhns Brothers Company, The .....

Langston Co., Samuel M. .....
Layne & Bowler, Inc. 1237
Leeds & Northrup Company 1116
Lindsay Wire Weaving Co., The 1230
Link-Belt Company 1169
Link-Belt Speeder Corporation 1143
Lockport Felt Company .....
Lodding Engineering Corp. .....
Lunkenheimer Co., The ..... 4th Cover

Mack Welding Company 1230
Magnus Metal Corporation 1235
Manchester Machine Company, The 1165
Mathieson Chemical Corporation .....
Michigan Steel Casting Co. 1224
Midwest-Fulton Machine Co., The 1219
Midwest Piping & Supply Co., Inc. .....
Milton Roy Company .....
Mine Safety Appliances Co. .....
Modern Engraving & Machine Co. .....
Moore & White Co. .....
Morden Machines Company 1170
Morningstar, Nicol, Inc. 1204
Mt. Vernon-Woodberry Mills, Inc. .....
Murray Mfg. Co., D. J. .....

Nash Engineering Co., The 1229
National Aluminate Corp. ..... 1st Cover
National Conveyor & Supply Co. .....
National Safety Council 1218
Naylor Pipe Company .....
Noble & Wood Machine Co. 1146
Norton Company .....
Nugent & Company, Inc., Wm. W. 1142

Ohio Injector Co., The 1175

(Continued on facing page)

Oldbury Electro-Chemical Co.....
Oliver United Filters, Inc.....
Orr Felt & Blanket Co., The.....

Paisley Products, Inc.....1204
Palmer Filter Equipment Company....
Paper & Industrial Appliances, Inc.....
Paper and Pulp Mill Catalogue.....1241
Paper Industry, The.....1237
Paper Makers' & Merchants' Directory of All Nations.....1228
Pennsylvania Flexible Metallic Tubing Co.....1166
Perfecting Service Co.....3rd Cover
Perkins & Son, Inc., B. F.....1134
Permutit Company, The.....
Photovolt Corporation.....1233
Pittsburgh Piping & Equipment Co.....
Poole Foundry & Machine Co.....1235
Powell Company, The Wm.....1119
Pusey & Jones Corp., The.....1150-1151

Quaker Rubber Corporation.....

Raymond Service, Inc., Chas. P.....1237
Read Standard Corporation.....
Rice Barton Corporation.....
Rice Barton Research Corp.....1155
Rogers & Co., Samuel C.....
Rohm & Haas Company, Resinous Products Division .....
Roots-Connersville Blower Corp.....1202
Ross Engineering Corp., J. O.....
Ross Heater & Mfg. Co., Inc.....1213
R-S Products Corporation.....

Sandusky Foundry & Machine Co.....
Sandy Hill Iron & Brass Works, The..
Sarco Company, Inc.....1237
Shartle Bros. Machine Co.....1128
Shuler & Benninghofen.....1118
Solvay Sales Division, Allied Chemical and Dye Corporation.....1225
Standard Oil Co. (Indiana).....1130
Stein, Hall & Company, Inc.....
Stephens-Adamson Mfg. Co.....
Stickle Steam Specialties Co.....1233
Sutherland, Inc.....1127
Sutherland Refiner Corp.....1117

Testing Machines, Inc.....1219
Timken Roller Bearing Co.....
Titanium Pigment Corporation.....1120
Toledo Scale Company.....
Tracerlab Inc.....
Tri-Clover Machine Co.....1144
Tropical Paint & Oil Co.....1115
Turney Halsey Company.....

U.S.A.—Treasury Dept.....

Valley Iron Works Company.....
Vanderbilt Co., Inc., R. T.....

Warren Steam Pump Co., Inc.....
Waterbury & Sons Co., H.....1233
Waterbury Felt Co., The.....
Western Precipitation Corp.....1207
Weyerhaeuser Timber Co.....
Whitney Chain Company.....
Williams-Gray Company .....
Wisconsin Wire Works.....1240
Worthington Pump & Machy. Corp. 1208, 1215
Wyandotte Chemicals Corporation....1198

Yarnall-Waring Company.....1129

Professional & Business Services Section

Dreshfield, Arthur C.....1236
Sirrine Company, J. E.....1236

Looking for Something?

★ **machinery?** ★ **equipment?**

★ **chemicals?** ★ **information?**

3 books in One!

1 THE BUYERS SERVICE SECTION . . . includes a complete, cross-indexed list of 150 of America's largest and most responsible manufacturers and Suppliers, and an exhaustive description of their products as they apply to the paper and pulp industry . . .

2 THE MANUFACTURERS CATALOGUE SECTION . . . contains pages, inserts and complete catalogues giving exact data on equipment available to the paper and pulp industry . . .

3 THE ENGINEERING HANDBOOK . . . is a comprehensive source of the vital facts of the industry, and quick information for the paper and pulp industry's executives and personnel—119 pages of engineering data, graphs, charts, tables, etc., etc.

IT'S IN YOUR MILL OFFICE—NOW!

Refer to it whenever you are "looking for something." Make it available to EVERYBODY in your plant. Cooperate: write us your comments and suggestions for improving the new 1952-53 edition now in preparation.

"The Paper and Pulp Mill Catalogue" and "The Paper Industry" are published by

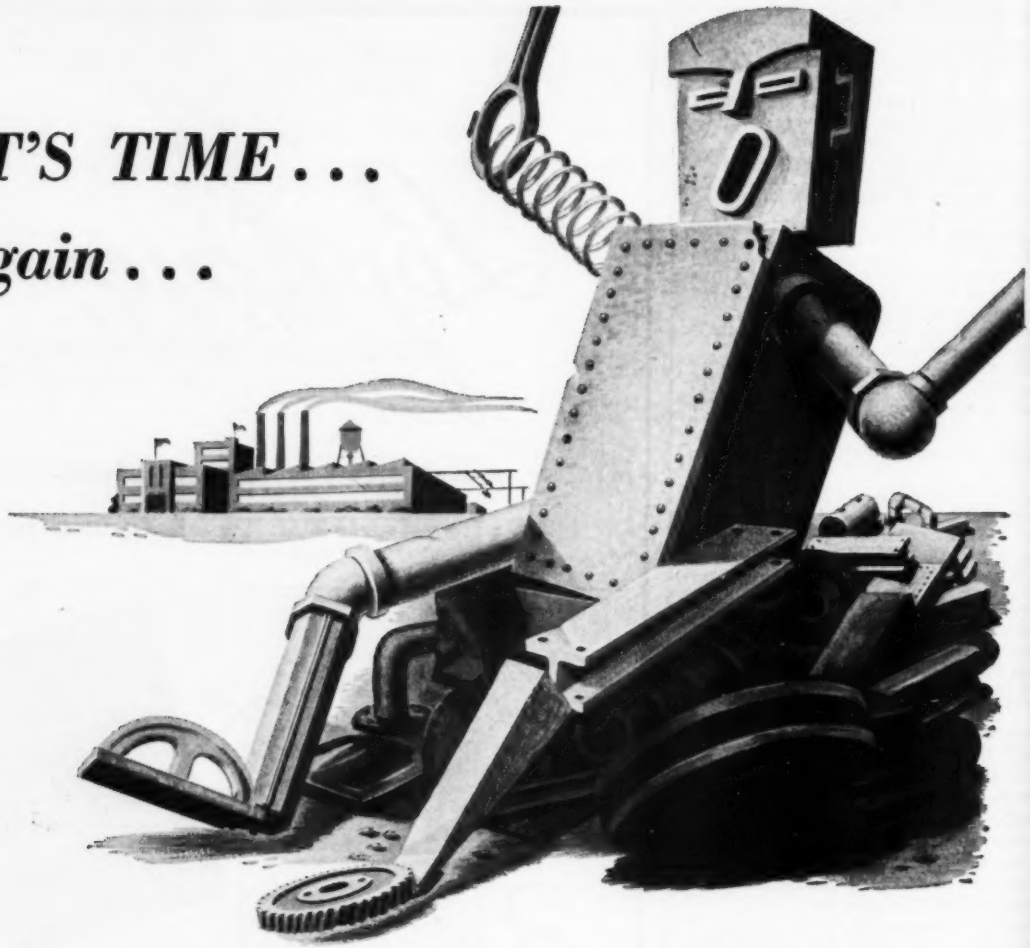
FRITZ PUBLICATIONS, INC.

431 SOUTH DEARBORN STREET . . . CHICAGO 5

Since 1919 — the Service Organization of the Paper and Pulp Industry

IT'S TIME . . .

again . . .



TO WAKE UP SCRAPPY!

Scrap's getting scarce again . . . compared to the amounts we need . . . and it's up to *all* of us to *help* produce enough steel.

107,000,000 tons of steel is the present rate of production in 1951 . . . 119,500,000 tons is expected in 1952.

Last year, 1950, we produced 97,800,000 tons.

All that extra steel—enough to take care of *both* military and civilian needs—calls for *more scrap iron and steel.*

Scrap Inventories Are Alarmingly Low

While steel mills are producing at a greater rate than ever, scrap inventories have dwindled. Many mills are operating on a hand-to-mouth basis with shut-downs threatened unless we furnish more scrap.

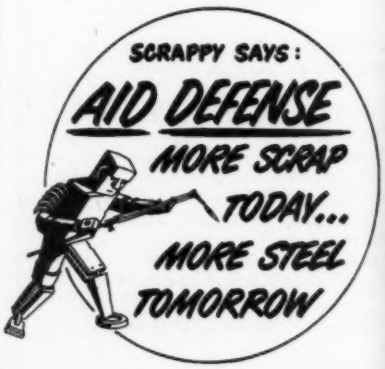
We *do* have the scrap. It's everywhere, not just in the form of *production* scrap—the "leavings" of machining, normally turned over to scrap dealers . . . but also in the form of *idle* metal: obsolete machines and tools, no-longer-usable jigs and fixtures, gears, chains, pulleys, valves, pipe, abandoned steel structures, etc.

We must have this *idle* metal to keep the furnaces running.

Please cooperate. Set up a Scrap Salvage Program in your plant—*now.* For a complete plan on "how to do it", write for booklet "Top Management: Your Program for Emergency Scrap Recovery". Address Advertising Council, 25 W. 45 Street, New York 19, N. Y.

Why Do We Need *Scrap?*

Steel is made half from pig iron, half from scrap. With production on the increase, more scrap must be purchased. And it's up to you to "dig it out" and sell it.



NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by

The PAPER INDUSTRY

A PUBLIC SERVICE PROJECT · THE ADVERTISING COUNCIL

Give S-M-O-O-T-H *sealing—1952 style*

The ROTARY UNION was revolutionary in design and performance when it was first introduced 19 years ago. Since then it has kept pace with the changes in the paper industry to accommodate the higher speeds, greater pressures, and wider extremes in temperatures required by newer production methods.

This Type "FSG" ROTARY UNION was designed especially for continuous heavy-duty service on revolving drying equipment. This unit is flanged directly to the journal and revolves with the drum itself. It employs a heavy-duty, low-friction, metal-backed graphite bearing which requires no lubrication. This outstanding feature enables the Type "FSG" to be used for continuous service on high pressure and high temperature applications.

SPECIALISTS IN STEAM JOINTS FOR OVER 19 YEARS

The two-point syphon support of this Type "FSG" ROTARY UNION assures better alignment of the syphon pipe, prevents wearing-through and falling-off of syphon pipes, and eliminates excessive strain on syphon pipe threads.

The "FSG" is the most modern and most efficient connection for revolving paper mill equipment. For full information write for catalog 600A or give us the details of your sealing problem. Expert engineering service is available for consultation on special problems.

"WHERE Good Connections COUNT"

PERFECTING SERVICE COMPANY

332 Atando Avenue (Home Office and Factory) Charlotte, N. C.

Offices in Chicago • Cleveland • Philadelphia • Providence • New York • Montreal, Canada

Control Corrosive Fluids...

WITH

LUNKENHEIMER

Causul Metal Valves

"Causul" Metal valves are available *only* from Lunkenheimer . . . to handle various concentrations of:

- Sulphuric acids and other fluids for chemical processing
- Dyes, alkaline liquors, detergents, and rayon solutions
- Caustic pulp liquors for Kraft and Soda paper processing
- Corrosive fluids in the sugar and food processing fields.

"Causul" metal is an austenitic iron, containing nickel, copper, chromium, and molybdenum. It has over twice the deflection of highest quality gray iron, and is free from the brittleness of high silicon, acid-resisting irons. Monel metal or Type-316 stainless steel trim is available. Write today for Circular 592, an eight-page brochure describing more than 100 of the many special corrosive services you can handle and the trim combinations that will give you the greatest economy. Address: The Lunkenheimer Company, Box 360S, Cincinnati 14, Ohio.

Figure 1639
"Causul" Metal
Gate Valve
200 lbs. W.O.G.

IRON • STEEL • BRONZE

LUNKENHEIMER

THE ONE *Great* NAME IN VALVES

L-451-7